









# TRANSACTIONS

OF THE

British Society for the  
Study of Orthodontics.

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1915.

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## ORDINARY MEETING.

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AN ordinary meeting of the Society was held at 11, Chandos Street, Cavendish Square, W., on Wednesday, January 13th, 1915, Mr. W. FRANCIS MELLERSH, President, in the chair.

### A TREATED CASE OF ANGLE'S CLASS III. (UNILATERAL).

By Mr. H. C. HIGHTON.

The following case is one of Angle's Class III., Sub-division I., and the patient was fourteen years of age when the treatment was commenced. The right and left lower six-year molars were very carious, the left one having completely broken down and the roots had to be removed, but it was possible to restore the right one to a useful state. Neither the twelve-year molar nor the second lower premolar had erupted on left side of lower arch when treatment was commenced. the centre line as shown in the second slide being moved almost the width of a lower incisor to the left side. In the maxilla both canines were outside the arch and the right second premolar was in lingual occlusion, due to the crowding of the teeth, which was particularly marked on the right side. The arch in the maxilla was rather shorter on both sides than normal, and according to the slight history that could be obtained, was due to the early loss of the temporary molars, which probably allowed the first permanent molars to come forward. There was a history of prevalence of caries in the temporary dentition, though apart from the lower six-year molars the permanent dentition was quite free from caries.

The treatment adopted was at first to place Angle clamp bands on the upper molars with an expansion arch ligated to all the other teeth, to obtain expansion in the premolar region, also to bring forward the upper incisors and force distally the six-year molars. In the mandible a clamp band was inserted on right lower molar, an X. band on L.L. premolar, squeeze bands to the six anterior teeth; the bands on left lateral and canine had small rings to allow arch to pass through, bands on R.L. central, lateral and canine had spurs under which arch was depressed to elevate them slightly and a small amount of expansion was used. After about two months the device was removed and clamp bands were inserted in upper molars, soldered with a lingual wire to squeeze bands on first premolars, with an expansion arch ligated to the four incisors. In the mandible a clamp band was inserted on the right lower molar, soldered to squeeze bands on first premolar, an X. band on L.L. premolar soldered to squeeze bands on canine and lateral. Squeeze bands with spurs were placed on the remaining lower incisors and canine, with spurs attached and firmly ligated to the arch. Spurs were also attached to the lower arch in the canine region on either side. For the first two months one rubber ligature and later two rubber ligatures were used on the right side only, the nuts were occasionally tightened in front of tubes on upper arch, with the object of correcting the centre line, bringing forward upper incisors to make room for the canines. Later two rubber ligatures were placed on the right side and one on the left side, and subsequently the position shown on the next slide was obtained. Considering the age of the patient it was deemed advisable not to attempt too much, consequently retention was made at this stage which consisted of clamp bands to upper

six-year molars, squeeze bands to first premolars and canines with lingual wire behind incisors and a spur on buccal side of molar bands in place of tube ; a buccal wire was also soldered on right side to ligate second premolar and obtain a better position for this tooth. In the lower arch a clamp band without the buccal tube was inserted in the right lower molar, squeeze bands to the right first premolar, the canine, lateral and central, on the left side squeeze bands inserted on both premolars and all bands soldered together with a buccal wire ; spurs were also placed opposite the canine region. For some time two rubber ligatures were used on right side and one on left, later two on right only, then one, which was reduced to a weaker ligature, subsequently worn at night only, and with increasing intervals of a few days between. All retention has now been removed for one year ; after having been kept in place for nearly two years, and the last slide shows the present condition from models taken last week. The increase in the upper arch in the measurement taken from between the centrals to the mesio-buccal cusp of the six-year molar is about two millimetres on left and about six millimetres on the right side.

The PRESIDENT said the case was a difficult one with complications and it seemed to him Mr. Highton must be congratulated on having obtained an excellent result.

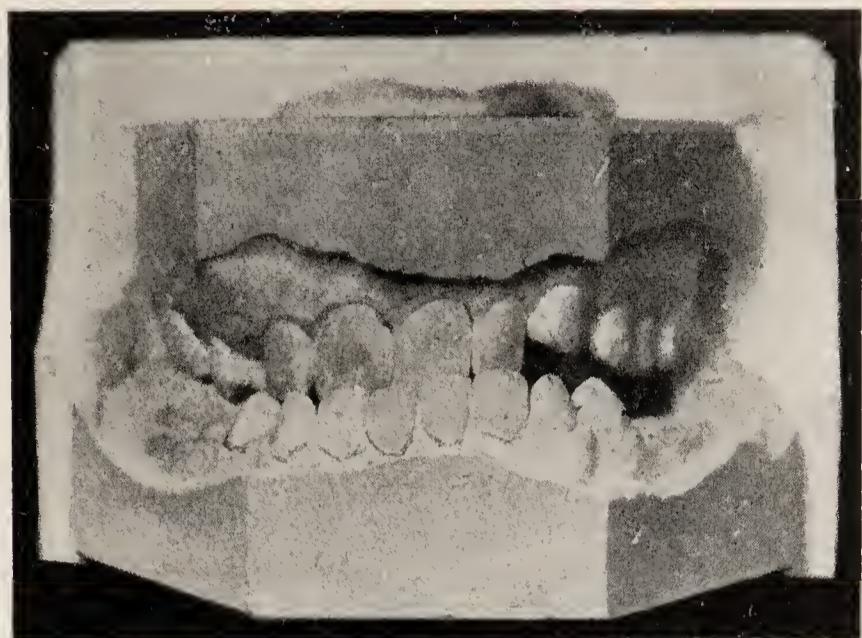
Mr. SCHELLING asked whether the retention was put on with cement, and how it was finally adjusted.

Mr. G. THOMSON asked whether Mr. Highton was aiming to get the upper incisors slightly to overlap the lower ones or trying to bring about an edge-to-edge bite.

Mr. GEORGE NORTHCROFT desired to know Mr. Highton's object in leaving the right lower six and restoring it. It seemed to him that in principle Class III. cases consisted of an abnormally large mandible and an abnormally small maxilla. In such a case it was necessary to approximate the size of the two arches. In cases of abnormally large mandibles Angle suggested treatment by taking out a V-shaped slice from the jaw containing a tooth, which was practically extracting a tooth and a bit of the alveolus as well. It had never been pointed out that that amounted to extraction for the treatment of mal-occlusion. If symmetrical extraction had been performed in Mr. Highton's case by the removal of both sixes he would probably have found it easier by drawing back the lower incisors to make the overlap of the upper centrals more pronounced. Unfortunately after the lapse of a year the left upper central had certainly gone back a little behind the lower incisor ; the distal corner of the incisor was now inside the arch. He could not help thinking it would have given the lower incisors a better chance to remain inside the lower arch had the right lower six been removed as well.

Mr. H. C. HIGHTON said the retention was cemented on after having been made twice. It was frequently broken and had to be replaced many times. The result he tried to obtain was Angle's normal occlusion, but the patient, when she came first to him was fourteen years of age, and was a fairly well-developed girl,—rather tall for her age, and he doubted at the start whether he should be able to do very much at all, and consequently was pleased to be able to get practically normal occlusion. He did not know whether the lower jaw was very much larger than the normal. The upper was certainly smaller. Anyhow the lower jaw was pushed across to the left side, almost causing a marked deformity by the bottom of the chin appearing to point that way. He had to use fairly strong forces to pull it back into anything like a reasonable position. There were very few teeth to work on and he could not get much anchorage on the side he wanted, the right side, as neither the twelve-year molar nor the second lower premolar had

A TREATED CASE OF ANGLE'S CLASS III. (UNILATERAL).



SLIDE 1.



SLIDE 2.

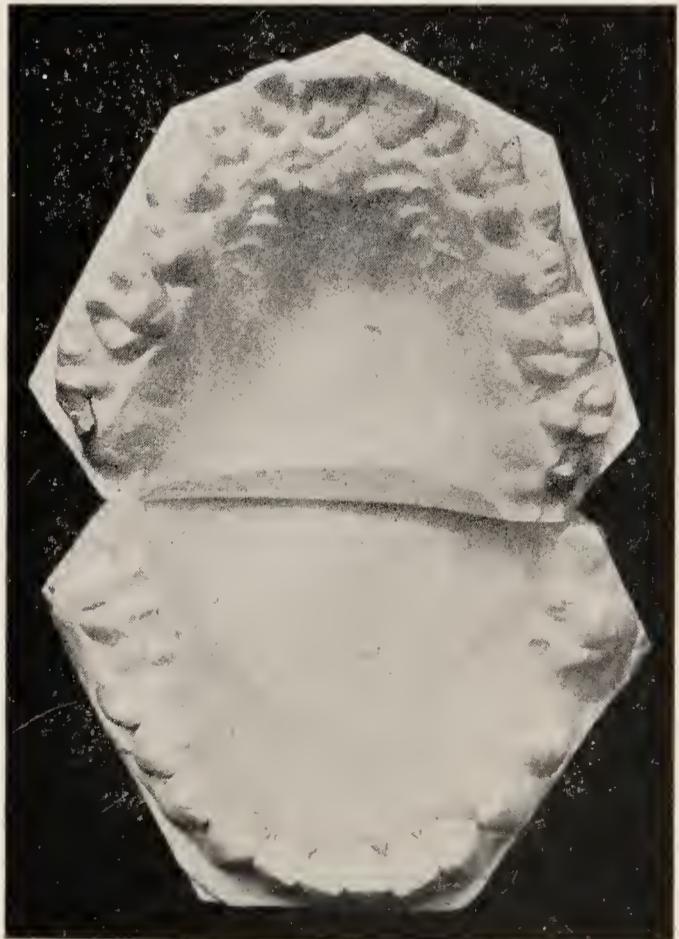


SLIDE 3.



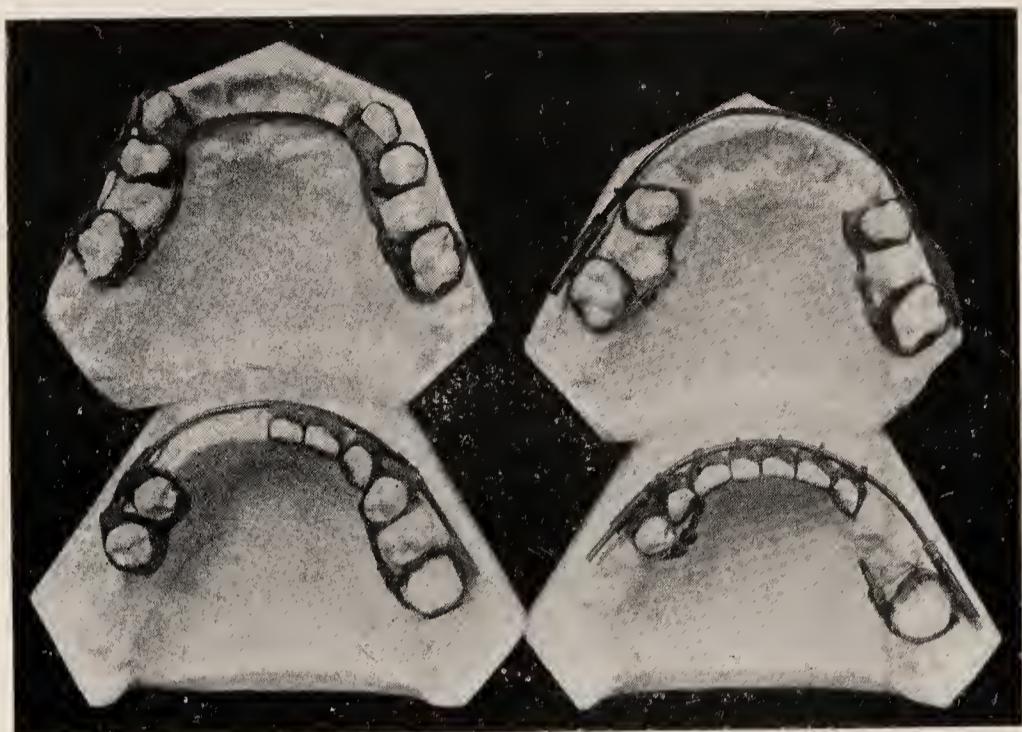
SLIDE 4.

To illustrate Mr. H. C. HIGHTON'S  
COMMUNICATION.



SLIDE 5.

A TREATED CASE OF ANGLE'S CLASS III. (UNILATERAL).



APPLIANCES  
USED.

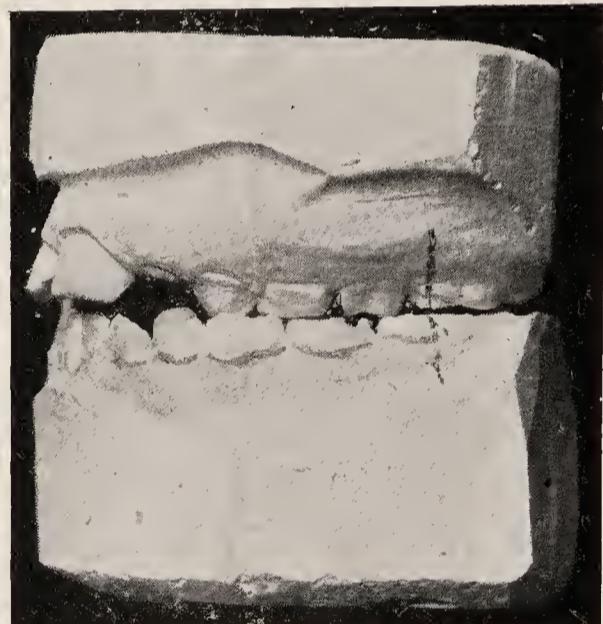
To illustrate Mr. H. C. HIGHTON'S PAPER.

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Mr. MORRIS'S CASE FOR DISCUSSION.



No. 1.  
Right side; normal occlusion.



Left side; post-normal occlusion.  
(Models articulated wrongly for side).



No. 3. Occlusal View.

erupted on either side in the mandibular arch when treatment was commenced.

### A Case for Discussion.

By Mr. C. S. MORRIS.

I feel I ought to make some apology for introducing this case, because it is a fairly simple one though at the same time there is a complication in the child's condition. She is subject to chorea and the question I wish members to give some answer to is what is to be done under the circumstances. The first slide shows the right side with normal occlusion, and it will be seen that the anterior part of the maxilla is standing well outside the mandible. The next slide shows a palatal view of the upper and a lingual view of the lower and gives a good idea of the situation. The molars are very much pitted and broken down. The doctor does not think she will be able to wear any fixed apparatus for any length of time, and it is a question of what she can wear to produce any result at all. If we consider that the right side is in normal occlusion and the left side post-normal, and the upper teeth bite inside on that side we have to consider what result we can get, and I should very much like to know what members would advise under the circumstances. The patient is just ten years old and she has had adenoids, which were removed fifteen months ago. She is in a very nervous condition, but otherwise is a fairly healthy child, though somewhat feeble on the whole and extraordinarily nervously unstable.

The PRESIDENT asked what the condition of the molars was.

Mr. MORRIS said they were just pitted, stomatitic teeth. He did not think that really complicated the case, because it was possible to build them up. The difficulty was how to get the upper teeth, which were V-shaped, into a moderately good state of occlusion. The doctor did not think she could wear a fixed appliance for anything beyond a week or a month.

Mr. HAROLD CHAPMAN asked why the patient could wear a fixed apparatus for two months and yet not wear it for three.

Mr. MORRIS said the doctor was dead against wearing anything at all, but if a fair result might be obtained with some sort of sleight of hand in a few weeks, he might allow the venture. The doctor was very much against anything being left on the teeth at all at present.

Mr. LEES asked whether the chorea symptoms were very marked.

Mr. MORRIS said she had not actually chorea at the present moment, but there was a fear of nervous disturbance being brought on.

Mr. LEES said it would be interesting to know whether the doctor really understood what a fixed apparatus was, because many medical men did not seem to know anything about the straightening of teeth. They had no idea that it was something like wearing a full upper and lower denture.

Mr. MORRIS said the doctor in charge of the case understood the treatment very well.

Mr. GEORGE NORTHCROFT asked whether it was not possible that the child's nervous condition may have been to a large extent due to the presence of post-nasal growths, and that the growths having been removed the child would now improve in health. He thought Mr. Morris had better take his courage in both hands and insert plates after his own pattern. It would overcome the objection of the doctor to a fixed apparatus and yet be a stable apparatus which the child could not fidget with and it would cause extremely little nervous excitement. It was difficult to expand an arch on one side only, but he himself would let both sides go out. The mandible required distinct widening, so that it would not hurt if the right-hand side of the maxilla was also made a little wider.

Mr. BADCOCK said the communication brought up the question of how much nervous disturbance regulation plates caused in children. He had come across the feeling on the part of a doctor before now that they were very distressing indeed and that they might set up very serious conditions. Personally he had never seen anything of the sort happen. He had always felt that if disturbances occurred it must be due, not so much to the apparatus which was used as to the way it was used, and that some of the blame must rest upon the operator. As to treatment, he thought Mr. Northcroft's suggestion was good. One of Mr. Morris's own plates would be as little irritating as anything. He had recently put such a plate in and it merely afforded the little patient great delight.

Mr. MORRIS said he entirely agreed with Mr. Badcock that properly adjusted plates or clamp bands caused extremely little inconvenience after a few days, especially expansion plates put in without Jackson's cribs. The question in the present case was whether the initial disturbance of having anything in the mouth would be deleterious. He questioned himself whether it would produce any nervous disturbance but the medical man in charge of the case thought it might bring on the attack of chorea. The maxilla could be quite easily expanded. The great question was how to obtain normal occlusion.

Mr. BLAABERG did not think there was any difficulty in getting the occlusion normal in the case. With regard to moving one side and keeping the other side stationary, that could be very easily brought about by boxing in the teeth on both sides and letting the occlusion be hard on that side of the plate which it was wished to keep stationary, but leaving the bite of the other side free so that the teeth may be moved easily. If an impression could be taken that would be a sufficient guide as to whether the child would be able to wear an appliance or not. He believed that after a day or two the child would rather have the appliance in than do without it. If the teeth with lingual occlusion were kept out of occlusion by the vulcanite caps over them the mesial-distal occlusion might right itself. Whilst the expansion was being done the gold wire coming round the front of the teeth could be slightly tightened in the canine region and would tend to draw in the outstanding centrals. If the incisors were too long, little hooks over their cutting edges would help to depress them in their sockets.

Mr. SCHELLING said the troubles with children gave a great deal of anxiety. Some years ago he attended a very beautiful child who required the molars on both sides of the upper jaw to be expanded and two outstanding centrals brought in. An endeavour was made to do that by a split Coffin plate with two gold wings pressing in the centrals. It worked very slowly, but the child had no objection to wearing the plate. When away for a long holiday one of his partners thought it would be advisable to make a more effective arrangement and carefully fitted an arch. The child made no objection for some time and then the mother wrote and said that the thing had become so extremely uncomfortable and the child was so nervous and irritable that she had taken the child to a dentist in the neighbourhood who had extracted two teeth after removing all apparatus.

The PRESIDENT said that very often fear of the unknown caused nervousness, not only in the child but on the part of the parents and the medical man and reacted seriously on the feelings of the patient. He recently saw a little girl who was so nervous that she was afraid of having a tray in her mouth; he obtained a composition impression with difficulty; at a subsequent visit it was possible to obtain a proper plaster impression and she is now contentedly wearing an expansion plate.

Mr. STEPHENS said it was really not a case of unilateral occlusion, but merely a very narrow jaw and the child was trying to get occlusion by pushing on one side. It was not a matter of holding one side while expanding the other. If the whole of the jaw were expanded the bite would rise on the cusps and gradually get right over. Finally, when the mouth was well expanded it would be found the child bit correctly over the lower cusps. The point occurred to him in Mr. Sturridge's communication when he talked about the dilemma of expanding the jaw on one side. If the models were put together in the centre line it would be seen there was not much difference.

Mr. MORRIS said the child chose the right side to bite on and never attempted to bite on the left side. It was one of the cases where a patient did bite inside on one side of the mouth regularly. He did not know how she had a post-normal bite on the left side and an internal bite on the same side on the upper jaw. He thought Mr. Northcroft's suggestion was the simplest. He did not believe in going to a great deal of trouble in trying to anchor one side; it was better to expand both sides and allow the other to come in. The question was whether a tooth should be extracted, say, the first upper left bicuspid, in order to get the upper front teeth into occlusion with the lower. That would bring the centre of the mouth round to the left. He was inclined to expand the jaw and get the occlusion normal, and then, if she was biting normally all round and the lower jaw maintained a fixed position in relation to the upper, extract the upper first bicuspid on the left side and get the front teeth in occlusion with the lower and let the centre take care of itself. It was a positive danger to allow lower incisors to bite almost into the gum just behind the palatal surfaces of the upper incisors as it almost always produced congestion and ultimately pyorrhœa.

Mr. BLAABERG asked whether the case was only one-half cusp post-normal on the one side.

Mr. MORRIS said it was a full cusp.

Mr. BLAABERG said it was rather difficult to see where the occlusion really occurred.

Mr. CHAPMAN asked whether any work had been done for the patient at all.

Mr. MORRIS said not.

Mr. CHAPMAN said holes would have to be drilled for the spurs and soon, and that was just as bad as fitting clamp bands as far as the effect on the patient was concerned. It occurred to him that the Morris plate was a very useful thing in the case, but not in the way that Mr. Northcroft suggested. He did not see the good of pushing out both sides if one side could be pushed out with very little trouble. He had not had an opportunity of trying it yet, but he thought the spring on the Morris plate would serve very well to expand one side or one tooth at a time and then it could be reversed and work carried on on the other teeth.

Mr. MORRIS said the only thing was that unless one tooth at a time was taken, in which case naturally enough the one would be pushed out and the others would remain where they originally were, one was bound to get the force operating on each side.

Mr. CHAPMAN said it would be possible to take two teeth at a time. It only meant changing the spring once to work on two others. Recently in order to expand one side he made a miniature Badcock plate to act on three teeth. The great disadvantage was that it had to have a thickened portion to get the screw working at right angles to the teeth. He had not seen the patient since and therefore could not say what the result was. Supposing Mr. Morris did expand both sides

equally he would like to know how he would hold the one and let the other relapse.

Mr. NORTHCROFT said he had tried the method mentioned by Mr. Chapman with the Morris plate and it worked admirably. The latch could have an extra spring put upon it and so throw out an individual tooth. His case was a right maxilla in lingual occlusion and the D required extra expansion and therefore he utilized the latch of a Morris plate. He was expanding the whole jaw at the same time, and the method worked admirably.

Mr. MORRIS said that was one of the advantages of the latch.

Mr. SPILLER asked whether the post-normal occlusion on one side was associated with abnormal nasal respiration on one side only.

Mr. MORRIS said he did not know.

The PRESIDENT considered that it would be better to expand for a time and then show the models.

Mr. BLAABERG asked whether the case was really post-normal occlusion in the lower or migration forward of the upper molar. If the latter, then possibly it was justifiable to extract an upper tooth, but if it was really post-normal occlusion of the lower it was permissible to see if a bite of convenience would not adjust the trouble.

Mr. MORRIS quite agreed. He had intended to put the occlusion normal and see what happened. It was a post-normal occlusion of the lower jaw and not a pre-normal occlusion of the upper. The centre of the mouth was the guide and it seemed to him that the teeth were in the centre line and that it was not a travelling forward of the upper molar; moreover, the centre line of the lower was on the left of the middle.

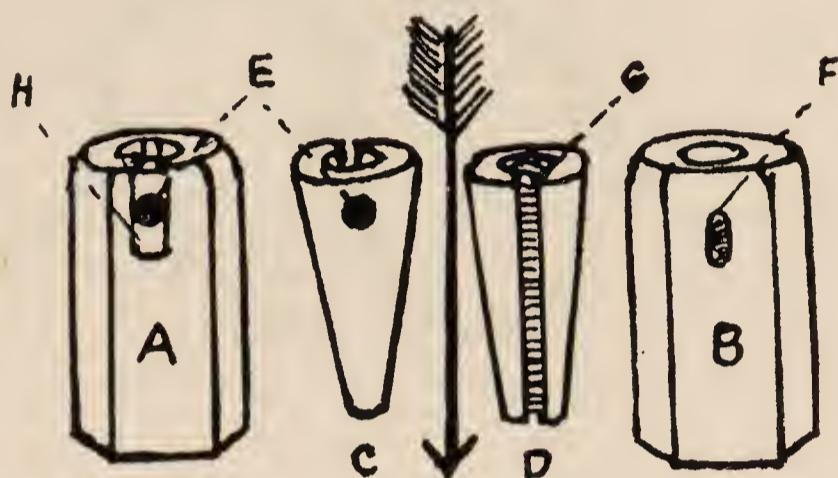
## The Blue Island Friction Nut.

By Mr. HEDLEY C. VISICK.

Mr. President and Gentlemen, having been a user of materials supplied by the Blue Island Speciality Company, of Blue Island, Illinois, U.S.A., for several years past, I thought it might be of interest to members of this Society to know the internal workings of the latest "friction nut" put on the market by this firm.

The external appearance of these friction nuts as originally supplied was as shown in Fig. A in the diagram, and there was obviously some internal mechanism concealed therein. Latterly the nuts have had the appearance shown in Fig. B. The only outward sign that the nut was in any way different from the ordinary nuts being a dent on one side, as shown at F. After close examination of this latest pattern nut, I was convinced that the Blue Island Company had given up the original friction nut, and was now putting on the market an imitation friction nut—with just a dent made in the side, to make it grip the arch better, although at the same time I could not quite reconcile this with the straight business policy adopted by this Company heretofore. I took a sample of each nut, and my grievance, to the agents of the Company here in London—Messrs. L. Porro, of New Cavendish Street, and made complaint to them. After examining the nuts, they too were of opinion that there was something very much wrong. They wrote to the Blue Island Company and made complaint, and asked for an explanation. The explanation was duly forthcoming, also some greatly enlarged samples of the nuts were sent for inspection, and I hand them round this evening. To take the old pattern first. It will be seen that the

nut consists of two parts, *viz.*, an outward sheath with a tapered hole bored into it, and an inward tapered sleeve which has a slot cut through one side of it, has a small stud fixed on the opposite side of it, and is threaded internally to fit the threaded arch; this sleeve is shown at C and D in the diagram. In the enlarged samples passed round for inspection it will be noted that the two parts can be easily separated, but in actual practice the nuts are supplied with the end turned over so that the sleeve cannot be removed from the sheath. The principle of the nut is as follows. When the nut is screwed on to an arch, or on to the threaded wire on a band, it can be moved freely in either direction, but soon as the flat end of the nut comes into contact with an



opposing force such as the tube on the outside of a band, or the ring on the inside of an all-closing band, the sleeve is driven forwards in the direction of the arrow in the diagram, and as it works in a tapered hole in the sheath, the tendency is for the sleeve to grip the arch more and more firmly. The sleeve cannot rotate in the sheath on account of the stud E, which engages the slot H in the sheath. The only way in which the new nut differs from the old is in the fact that the stud in the sleeve is done away with, and there is no slot H in the sheath.

The little dent shown at F in Fig. B engages with the slot G in Fig. D.

I hope I have managed to make the working of this nut clear to members, as I find in practice that it gives very good results indeed, and does away with the necessity of a lock nut.

Mr. GEORGE NORTHCROFT said the Society should be grateful to Mr. Visick for bringing forward his communication, and hoped that the large models of the appliance would be left with the Curator of the Museum for the purpose of reference.

Mr. VISICK said he hoped to obtain some samples shortly and should be very pleased to deposit them with the Curator.

## Uses for Vertical Tubes in Minor Tooth Movements.

By Mr. HAROLD CHAPMAN, L.D.S.Eng., D.D.S. Penn.

I have recently made use of the vertical tube for some minor tooth movements with gratifying results. It seems, therefore, worth while to bring two or three examples before the Society in case there are some to whom the application of the principle may be new, though I claim

no originality for it. In fact, it is the principle shown by Mr. Friel in November last, applied to one or two teeth only instead of to the entire dental arch.

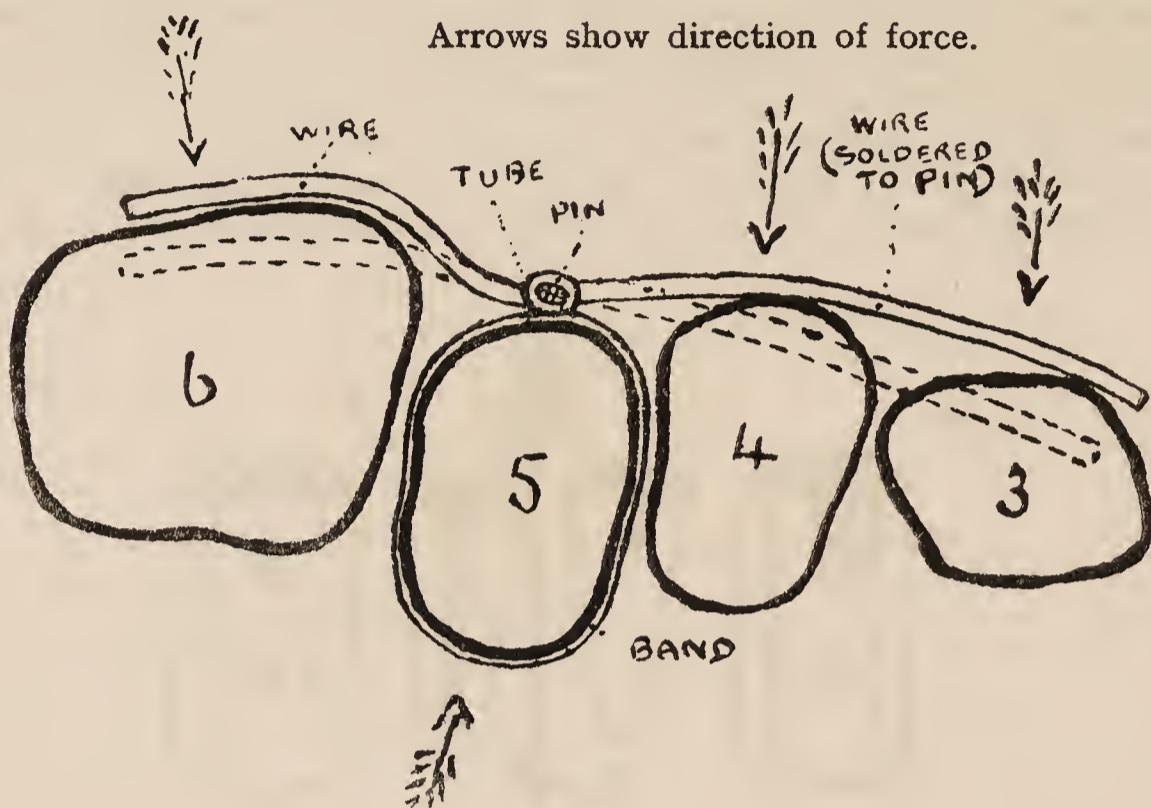


Fig. 1 (a) Cross-section through teeth. The dotted lines show the position of the rest of the wire after it has been bent to give it spring and to move the teeth.

The simplest case was that of a Belgian girl who had been treated in her own country before the war. To complete the treatment there only remained a second upper premolar to be moved buccally (Fig. 1).

A plain band was made for this tooth and a vertical tube soldered to it on its buccal aspect. To one end of a pin which accurately fitted

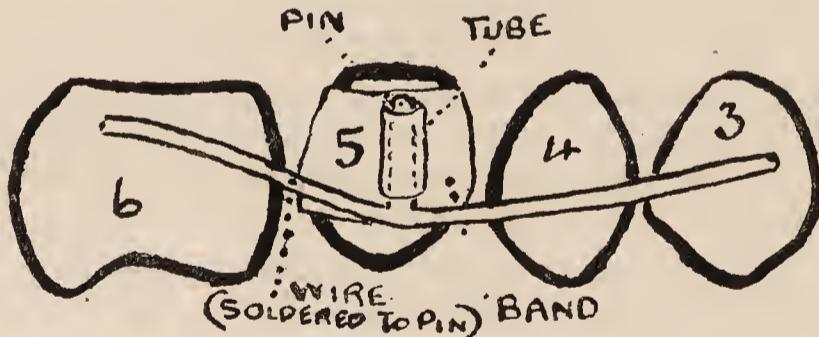


Fig. 1 (b) Buccal view.

the tube was soldered a piece of wire bent to engage the buccal surfaces of the canine and first premolar medially and the first molar distally. The other end of the pin was prepared so that it would lock in the tube as described by Mr. Friel. The appliance is ready for use when the two ends of the wire have been bent palatally so that force will be exerted to move the premolar (on the principle of simple anchorage) in the desired direction when it is placed in position. By bending the wire more or less the movement of the tooth may be increased or decreased, and when movement is complete the appliance is used for

retention, any remaining spring when the wire is against the teeth being done away with. The construction and application of such an appliance is very simple, in use it is just as efficient and a new appliance for retention is not necessary. In practice I have found it more simple, easier to manipulate and more efficient than anything I have previously used for a similar purpose. Its action is the same as that of a Siegfried spring.

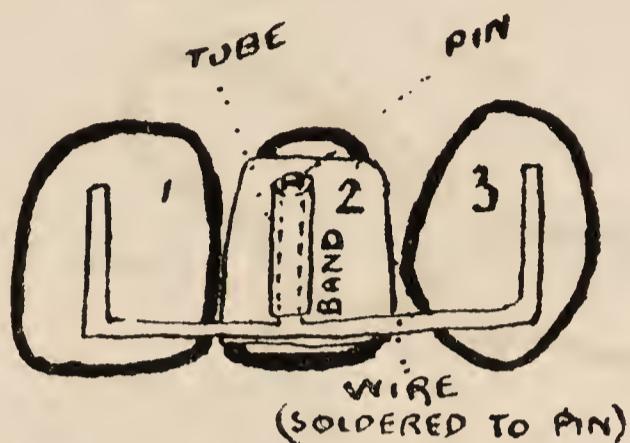


Fig. 2 (a) Buccal View.

In another case I had completed the necessary tooth movements except in regard to one upper lateral, whose crown had a pronounced buccal inclination. I wished to correct this by buccal movement of the apex of the lateral. As in the previous case the affected tooth was banded and a vertical tube attached to the centre of the buccal surface

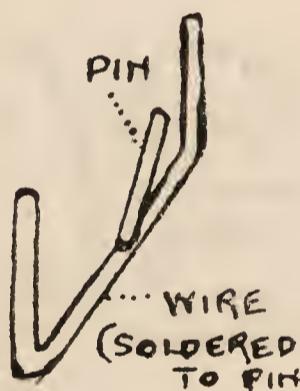


Fig. 2 (b) Wire and pin ready for use. The pin is not soldered to the wire parallel with the bent extremities of the latter, but at such an angle that the apex of the lateral will be moved buccally.

of the band. The horizontal wire was then chosen and bent as shown in Fig. 2, *i.e.*, so that it not only engages the next approximal tooth, on each side, medio-distally, but also from the incisal edge to the neck. The pin to engage the tube was now soldered to the horizontal wire, so that it lies in the plane to be occupied by the lateral if the required movement is not great. If more movement is needed the pin must be resoldered.

The third case (Fig. 3) was one in which an approximal central and lateral had to be rotated; the movement of the former was more important, so this tooth was banded and a vertical tube soldered on the buccal aspect towards the edge which was turned palatally. As two approximal corners needed rotation buccally a spur was soldered

to the lingual surface of the central band so that it engaged the medial corner of the lateral lingually. Just as in the other cases, a horizontal wire to which the pin to engage the tube was already soldered was

Arrows show direction of force.

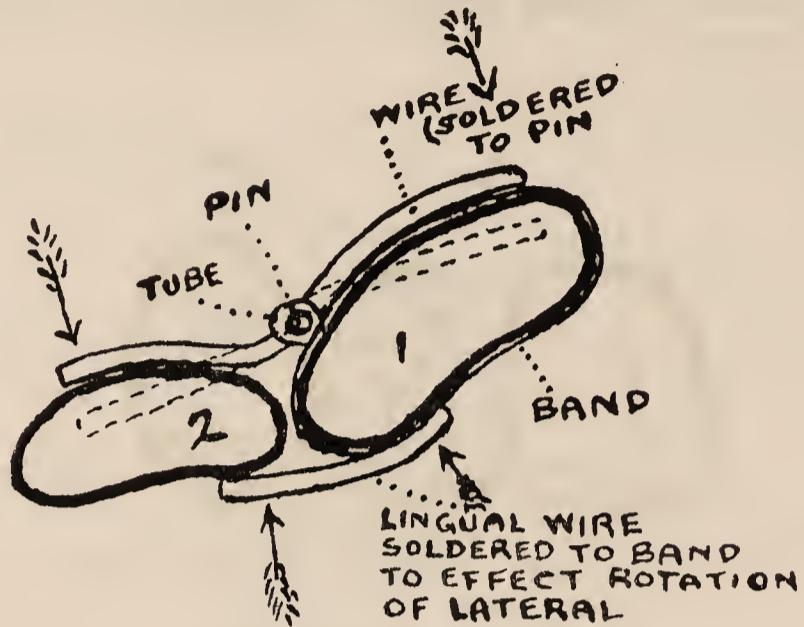


Fig. 3 (a) Cross section to show original position of teeth and arrangement of appliance.

bent to engage the buccal surfaces of the central and lateral. When it is desired to begin movement it is only necessary to bend the horizontal wire so that it will exert pressure on the medial corner of the central and distal corner of the lateral, and then spring it into position in the vertical tube.

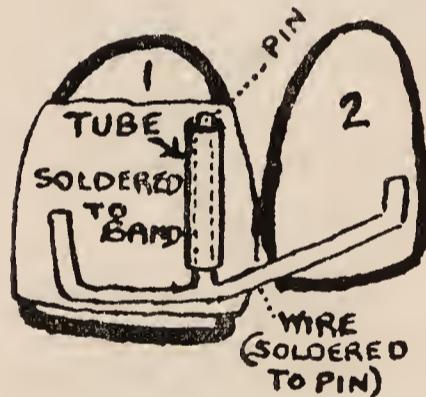


Fig. 3 (b) Buccal view, to show position of tube to obtain rotation buccally, of the distal corner of the central.

In this last case the teeth are not fully erupted and I have had some trouble with the band on the central coming off, but the great advantage of early treatment (the age of the patient is  $7\frac{1}{2}$  and I first started rotation of the central as soon as it appeared through the gum) has been demonstrated by the almost entire absence of tendency to relapse; when this particular tooth started to erupt its medial aspect presented buccally; a fortnight ago the band was off for one week at the end of which time I could not detect that any relapse had occurred; unfortunately this is not my experience when the patients are twelve or fourteen.

In view of Mr. Friel's paper little need be said of the materials used to construct the appliances. The bands were constructed of iridio-platinum 10 per cent.  $\frac{3}{1000}$  in. in thickness and  $\frac{6}{32}$  in. wide or, in

the case of the premolar, platinized gold  $\frac{1}{1000}$  in. and  $\frac{2}{100}$  in. wide. The tubing was to take '030 in. diameter wire and also of iridio-platinum. The wire and pins were platinized gold, '030 in. in diameter. This latter must be very springy, a property which must not be destroyed by heat. I have used both the S.S.W. make referred to by Mr. Friel and Aderer's No. 4 platinized gold wire (this contains more platinum than their ordinary wire), which is a very similar alloy. That the same appliance, without any reconstruction, can be used perfectly well for retention as well as for active movement, I regard as not the least of the advantages in the use of the principle I have spoken of.

The **PRESIDENT** said the members were grateful to Mr. Chapman for his valuable communication. Vertical tubes seemed to be capable of considerably extended use.

Mr. **FRIEL** explained on the blackboard his method of using tubes, and said that in very young children, where the upper centrals were just erupting and room was required for expansion, he put the vertical tubes on the two temporary canines, with a thin wire bent into a loop with the ends of the wire pushed into the tubes on the canines, opening the loop at intervals. That spread the canines and gave no trouble to the patient. The centrals and laterals would straighten themselves.

Mr. **HEDLEY VISICK** said the communication was a very valuable one, because it helped men in their everyday work. It should be an example to other members who had any useful tips they had found of service in practice to bring them forward and make them of value to others who did not happen to know them.

The **PRESIDENT** then delivered the following inaugural address.

### **President's Inaugural Address.**

I am deeply sensible of the honour you have conferred on me by electing me your President. I am so entirely a student of matters pertaining to orthodontics that I feel unworthy to be the occupant of an office held by predecessors whose work will one day, it is hoped, entitle them to the name of "Master."

I should therefore prefer to continue at my student's seat rather than occupy this chair, but it was pointed out to me that in this Society we are all students and that it was my duty to take my turn in encouraging others to keep the flame brightly burning. I therefore crave your indulgence and ask you to bear with me for the term of my office.

As a student one certainly feels diffident when looking through the *Transactions* of our Society, in accepting any one statement in regard to a particular problem as the whole truth. A theory is formulated, elaborated and accepted by many, as presumably correct; suddenly an advocate of diametrically opposed opinions arises, and one begins to doubt again.

Since the foundation of the Society in 1907 a great amount of valuable work has been accomplished under its influence, and I much desire to see this influence extended. Although the future welfare of our race may be said to materially depend on correct occlusion of teeth of good structure, I think there is evidence that in many quarters the study of orthodontics does not yet receive that attention its importance demands, and that the treatment of cases is undertaken without interest, as a necessary evil, and at the latest possible moment, after the adoption of a "wait and see" policy, to decide whether Nature, unaided will convert mal-opposed teeth into a regular arch.

The need of missionary effort on our part was brought to mind by the following. Some time ago a child aged eight was brought to me for treatment ; the case presented marked crowding in the incisor region, both upper and lower, and the necessary apparatus was designed and made. The mother was taking the child to the coast and there was not time to insert the appliances. These were forwarded to a local practitioner with a note in which I requested him to take charge of the case during the patient's stay in his district. Weeks afterwards the little patient returned to me with the plates unworn, the local dentist having refused to co-operate, on the ground that it was wrong to try and regulate teeth at so early an age, and that no treatment ought to be commenced before ten or eleven.

There is, of course, the school which is opposed to expansion of the dental arches and which advises the removal of the unerupted premolars to relieve typical malposition of laterals caused by pressure of the canines, but I must say the happiest results have followed judicious expansion, in my hands, at an early age when it was obvious that relief of pressure and stimulation of growth was indicated.

My firm conviction is that by attention to diet, early removal of adenoids, the use of the anti-mouth breathing valve, followed by mechanical treatment as soon as there is indication of mal-development, we shall obtain the most satisfactory results for all concerned.

One frequently hears that adenoids are directly attributable to a cold, damp climate. I have known children who have suffered from and been operated on for adenoids in India, in a district in South America where the rainfall is so scanty that the water supply is condensed sea water, and I am told by a doctor from Java that in this island, Sumatra and the Malay Peninsula, the typical adenoid face is common amongst the natives. Bedouin children also are said to develop post-nasal growths.

Sir Arbuthnot Lane may have raised doubts as to the most desirable treatment for such growths. I hope during this year it may be possible to obtain the considered opinions of other competent experts.

Possibly no problem with which orthodontists have to deal, has given rise to more speculation than post-normal occlusion. For long I have held that difficult parturition might be a contributory cause and it was therefore with great interest one heard Mr. J. F. Colyer's suggestions at the Royal College of Surgeons on this subject.

I feel sure that investigations of conditions prior to and during birth may add materially to our knowledge of this subject.

It is hoped that members will act upon the suggestion of our honorary secretary and bring forward a greater number of cases for discussion, as thereby the usefulness of our Society may be extended for the benefit of all.

I will not weary you further, as wrestling with a bad attack of influenza is not compatible with writing a presidential address. Our year opens amidst the anxieties of a European War, may these soon pass away, so that all progressive scientific work may be continued under the stimulating and benign influence of universal peace.

Mr. NORTHCROFT rose with great pleasure to propose a very hearty vote of thanks to the President for his illuminating inaugural address. Everyone knew what an earnest student Mr. Mellersh was and how anxious he was to do the best that lay within his power for his patients, and the members looked to him as an example.

Mr. J. H. BADCOCK said it was hardly necessary to second the motion, it would be carried very heartily. He wished, however, to do so and

to thank the President particularly for sounding the note of student-ship. It should be remembered that the Society was for the study of Orthodontics, and if that were borne in mind more often the younger members of the Society would perhaps be less diffident in coming forward. They should remember that they were members of a body of professors, but of students. Nothing was too small and no difficulty too unimportant to be of interest to the rest of the students.

The motion was carried with acclamation.

The **PRESIDENT** said he was extremely obliged to the members for the kind manner in which they had received his poor effort in the way of an inaugural address. He felt happier then than he did at the commencement of the meeting, because on an occasion such as this he had naturally a considerable amount of nervousness. He had many kind friends in the Society and it was possessed of so excellent a secretary and treasurer, and such an able Council that he felt their kind co-operation would lighten his work very considerably during the coming year.

The **PRESIDENT** having thanked the members who had brought forward communications, the Society adjourned until February 10th.

## ORDINARY MEETING.

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AN ordinary meeting of the Society was held at 11, Chandos Street, Cavendish Square, on Wednesday, February 10th, 1915, Mr. W. F. MELLERSH, President, in the chair.

### CASUAL COMMUNICATIONS.

#### **A Case of Abnormally Small Jaws.**

By Mr. J. W. DOHERTY.

I think the following case of abnormally small jaws may be of interest. The patient is a girl aged seven and a half years, quite normally built, 4 ft. 1 in. in height, which I suppose is a good height for her age. She was breast fed for the first six months. She has no adenoids, breathes through her nose, though very occasionally has been noticed breathing through her mouth. She is a perfectly healthy child. With regard to the family characteristics, her father is said to have a small mouth and very bad teeth, her mother has quite normal jaws and good teeth ; a sister has a very crowded mouth. I am purposely omitting the question of treatment, the case having passed out of my hands, but I should like to hear suggestions.

Along with this case I should like to show models of another child whose mouth you will see is very small, but not so pronouncedly as in the first case. This child, however, is poorly developed in every way, a mite of a child, who for the first three or four years of her life was only just kept alive. The models were taken four years ago, yet they show the jaws to have been better developed than in the first case. It is interesting in the fact that Thyroid extract had been administered for, I understand, about eighteen months, and the more recent models show some improvement.

The PRESIDENT asked whether there were any signs of the six-year molars.

Mr. DOHERTY said none whatever.

Mr. HIGHTON suggested that skiagrams should be taken to see the position of the permanent teeth.

Mr. DOHERTY thought that was a good suggestion.

Mr. MAXWELL STEPHENS said he had never administered Thyroid extract or advised its use, but it would be interesting to have the particulars of the dosage and how long it was continued.

Mr. DOHERTY said he had never administered Thyroid extract, but he would endeavour to obtain the information.

Mr. GEORGE NORTHCROFT could not help thinking that the models rather tended to exaggerate Mr. Doherty's point as to the smallness of the jaws, as there must be a good deal more tissue behind the temporary molars than was shown by the models. He himself had had cases where children of eight years of age had not had the first permanent molars erupted ; the jaws were not necessarily small, although they would look very small if the models had stopped at the posterior surfaces of the second temporary molars.

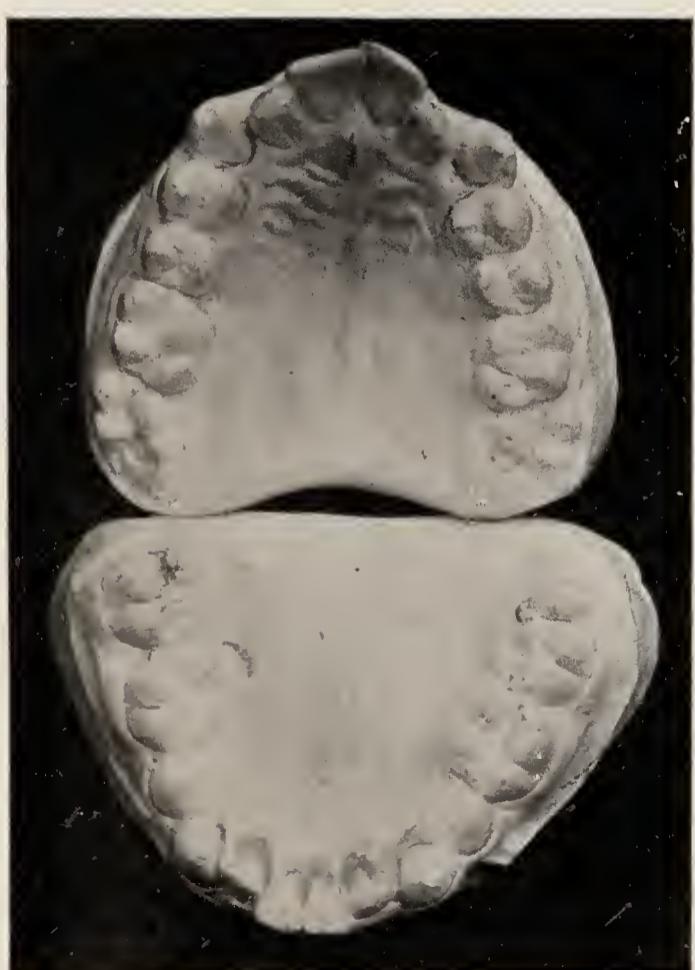
A CASE OF ABNORMALLY SMALL JAWS.



CASE I.



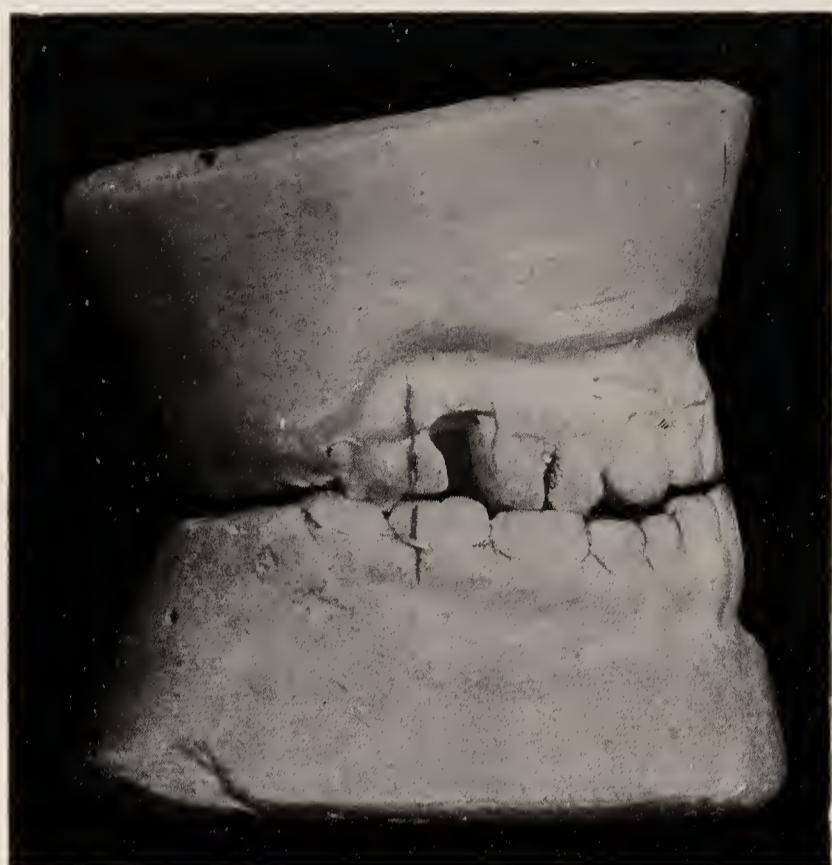
CASE II.



To illustrate Mr. M. Philpot's  
Communication.



CASE II.  
To illustrate Mr. Doherty's  
Communication.



CASE I.



CASE II.



CASE III.

To illustrate Mr. George Thomson's Communication.

Mr. DOHERTY thought the smallness lay chiefly in the breadth of the arch and not in the length of the arch.

Mr. HAROLD CHAPMAN said the models showed the jaw to be very narrow in the canine region, the space between these teeth being fully occupied by two permanent centrals and one deciduous lateral.

Mr. RUSHTON said it would be interesting to have actual measurements for comparison. Also, Mr. Doherty might let the Society know how he treated the case in future and whether any extraction was necessary.

The PRESIDENT asked Mr. Doherty whether he had any treatment in mind in the way of expansion.

Mr. DOHERTY said the case had passed out of his hands, but he had intended to try to fit bands on to the temporary molars and use an internal arch for expansion. He had the idea of trying to incorporate an expansion screw in the arch so that it might be turned by the patient. No doubt extraction would be necessary later on.

Mr. J. E. SPILLER said he had had a case three or four years ago which he believed had almost the same size of arch. The parents did not wish the case to be treated at the time, but treatment was commenced a year later with expansion plates, and after twelve months' treatment, the patient only wearing the expansion plates at night, she had a well-developed arch with all the teeth that should be present at her age.

Mr. M. PHILPOTS showed models of a boy aged fifteen, a very small boy, and asked for some advice as to treatment. He thought it was quite clear that the second lower bicuspids had been removed. The father was very much adverse to extraction. All the canines were very much pointed and he thought, if the first upper bicuspids were removed, it would be difficult to pull back the upper canines behind the lower canines. The right upper lateral was not very good and had been filled, and there was a cavity in the central.

Mr. POLLITT suggested that the laterals should be extracted.

Mr. GEORGE THOMSON thought the extraction of a lower lateral would be of benefit.

Mr. CHAPMAN asked Mr. Pollitt which lateral he would extract.

Mr. POLLITT said the upper lateral. It appeared to him that one lateral was carious. By extracting the tooth the central could be better filled and possibly with a little regulation it might be helpful treatment having regard to the boy's age. He suggested leaving the lower as it was.

Mr. SCHELLING thought the principal difficulty in the case was the fact that apparently the upper canines could not be drawn back. The lower canines seemed to have locked the upper canines. He should feel disposed to expand the upper jaw, especially in the region of the bicuspids and the canines, in the hope of pushing the laterals into their normal place. He did not think it would be difficult to find room for all the teeth. The fact that the canines were so locked was against any other sort of treatment except expansion.

Mr. SPILLER said the great drawback to expansion in the upper jaw was that in reality it was a case of post-normal occlusion. The lower molars had travelled forward.

The PRESIDENT thought Mr. Spiller was in favour of trying extraction.

Mr. SPILLER said it depended on circumstances whether the first bicuspids or the laterals should be extracted, and as the lower front teeth were so crowded a tooth might probably be taken out there—he was not quite sure which, but probably one of the lower centrals.

Mr. NORTHCROFT was inclined to agree with Mr. Spiller's opinion. The fact that two lower teeth had been already sacrificed might make it advisable to sacrifice two teeth in the upper jaw as well. The choice

of teeth would depend a good deal on the condition of the laterals or first premolars. On the left side there would be no difficulty in bringing the left upper canine into place and he did not think there would be much difficulty on the right-hand side. If the laterals were very carious and the patient was not able to come sufficiently frequently for a course of treatment, certainly a short cut would be the extraction of the laterals and perhaps a lower incisor, but he only suggested that as making the best of a bad job.

Mr. PHILPOTS said the right lateral was markedly carious.

Mr. CHAPMAN agreed with those who had suggested keeping all the teeth—unless the lateral was so markedly carious that it must be lost—and would expand both the upper and lower jaws an equal amount so as to get the incisors into alignment. The boy would have very good occlusion, although an excessive overbite, which would be probably one of the least disadvantages he would suffer under any form of treatment. He was always surprised when, at the age of this patient, he heard it suggested that the two premolars should be removed and the canines pulled back to occupy the spaces, because in most of the cases he had seen where that had been done the remaining premolar and first molar moved more forward than the canine was moved distally. It was just as difficult, if not more so, to move back the canines as to expand the two jaws. It occurred to him that probably the cause of the very pointed canines might be a mild stomatitis at the time of calcification of the teeth.

The PRESIDENT said it would be interesting to have the members' experience with regard to pulling back the canines, and he would like to know which suggestion of those that had been made Mr. Philpots felt most inclined to adopt.

Mr. PHILPOTS said he had not had time to make up his mind, but he thought the boy's parents could be persuaded to have something done.

Mr. GEORGE THOMSON exhibited models of three cases on which he desired advice. The first was a case in which the mandible was much too large for the maxilla. The teeth articulated very badly and there was an open bite. The case was prenormal. The patient was twenty-three years of age, a woman, with quite regular features. The molars of the mandible in the mouth seemed to be very much larger than the upper ones, though in the model that did not seem so obvious. He did not know whether he was going to adopt any treatment at all unless he ground down some of the back teeth.

The second case was one of overbite. The molar teeth were very short and the lower incisors would bite on the gum if the girl, who was eleven years of age, was not wearing a plate. Her father's incisor teeth were arranged exactly in the same way, but his bite was different.

The third case was that of a girl seventeen years of age who had unfortunately lost some of her teeth. There were two or three ways in which the case might be treated. The incisors were all carious and the first lower molar had been lost. On the other side the six-year molar was removed some years ago and the other one recently, so that there were no molars on that side. He was chiefly concerned as to whether he should extract the upper first premolars and pull the teeth back or whether, as they were very carious, they might be cut off and crowned.

The PRESIDENT asked whether much good would result in the first case from grinding down the bite.

Mr. THOMSON said he did not think so. The only question was whether, not having a bite in front, she might get pyorrhœa.

The PRESIDENT questioned if it would be possible to grind down sufficiently to enable the front teeth to occlude.

Mr. THOMSON agreed.

Mr. MAXWELL STEPHENS said Mr. W. B. Paterson at one time showed his students a case in which he devitalized the back molars and put on very flat tops, and thus brought the bite together.

Mr. THOMSON said the child in the second case lived so far from London that he could not easily go on expanding.

Mr. CHAPMAN asked whether any teeth had been removed.

Mr. THOMSON said no.

Mr. CHAPMAN said it seemed to him a case which could be treated very well on orthodox lines by expanding the upper and lower jaws and bringing the lower forward.

Mr. SCHELLING said in cases somewhat similar a plain biting plate to bring all the bite on the lower six or eight front teeth, vulcanizing the plate with a piece of tinfoil over the palatal surfaces of the upper incisors to make sure that the plate did not press them outwards, had been very efficacious. In some of his own cases the parents had commented on the improved appearance of the child, because the face was longer on account of the back teeth having elongated. It was possible then to regulate the upper incisors, which one could hardly do while they were being held in a forward position by the lower incisors. He had seen a similar case that day, a child who had been wearing a plate for the last six months and had twice had the bite raised, and now he proposed to pull in the two upper centrals. The improvement in appearance was very great.

Mr. CHAPMAN agreed with Mr. Schelling and would include a biting plate in the treatment he had suggested.

Mr. NORTHCROFT thought the first and last cases were scarcely cases that offered themselves for orthodontic treatment. They were unfortunate types of cases where the irregularity had not been recognised early enough for anything to be done for the patient. In the second case he certainly should feel inclined to carry out the treatment of using a biting plate and subsequent expansion of the arch.

#### A SUGGESTION FOR THE RETENTION OF EXPANSION PLATES.

The PRESIDENT put forward models illustrating a suggestion for the retention of upper or lower expansion plates, and asked the opinions of members with regard to the matter. It had been designed with the view of not interfering with the occlusion. In many cases he found the apparatus act very well. It was easy to increase the tension on the cervical margin if necessary by bending the attachment a little. There was no need to have a fixed point of attachment at each end. It was sufficient to solder it on to the loop of wire which came round the back molar and the front part could be left free.

Mr. NORTHCROFT said one of the practical difficulties he had always had to contend with in the placing in position of outside cribs on gingival margins was that models had to be taken very accurately and the bands placed very carefully in position; otherwise in temporary teeth one very often found the band riding on an inclined plane and it had a tendency to pull the plate out of the mouth. Mr. Badcock always laid very great stress on the necessity of carving the gum well away at the gingival border before Jackson cribs were placed in position for that very reason, that it was necessary to see that the wire was over the enamel ridge that occurred on all temporary teeth. It was a point of great importance.

Mr. SCHELLING said he had several times used a band of that sort to hold up a small skeleton gold upper denture, where it had been desirable to use as small a plate as possible.

The **PRESIDENT** said he did not say that what he had put forward was the best in every case. In cases such as Mr. Northcroft spoke of it might have the tendency to bring the plate down.

Mr. **RUSHTON** asked what was done when there was no space such as that between the lateral and the canine for the wire to go through.

The **PRESIDENT** said it was not necessary to fix the wire at this point in every case. It need only grip the first and second molars, and wire need only be attached at one point. In many cases such an arrangement had worked well and was sufficiently stable. The photographs had been taken with a telephoto lens, a lens which it seemed to him might be very useful for the Society's illustrations.

Some time ago he had shown a modification of the Badcock expansion screw. It had one guide-bar, which was made of a half-round wire sliding in a tube of the same section, and was of base metal. It was not a great success, the parts being so small became readily oxidized, the screws likewise. Then the idea occurred of having a pair of parallel guide-bars, the whole being of 9-carat gold, and he was pleased with this. When the plate was expanded to the fullest extent the screw remained rigid, and there was not much lateral play. The wrench shown in the illustration was a broken bur with the end cut flat with a carborundum stone. He exhibited models showing the screw mounted on cast plates and a wax pattern for a cast plate.

Mr. **NORTHCROFT** said it was well known that it was Mr. Mellersh's custom to use gold plates and not vulcanite, but all dental surgeons were not such expert casters and the difficulty he himself had found in using the form of the Badcock screw shown was to get the ends sufficiently rough to attach them securely to the vulcanite. It was a screw well adapted for inserting into cast work, but for vulcanite it was necessary to make little tags on the ends, and personally he preferred vulcanite to cast gold. It was a distinct improvement to use 9-carat gold for the screws, as it did not oxidize and the screws worked smoothly during the whole time.

The **PRESIDENT** said he had stated that he preferred gold plates to vulcanite, but found he was using more vulcanite plates now than gold ones. At the time he brought the cast plates to the notice of the Society he was certainly rather keen about the method, but had now to confess there was much to be said for the vulcanite plate, which was certainly a more snugly fitting plate than one of cast metal.

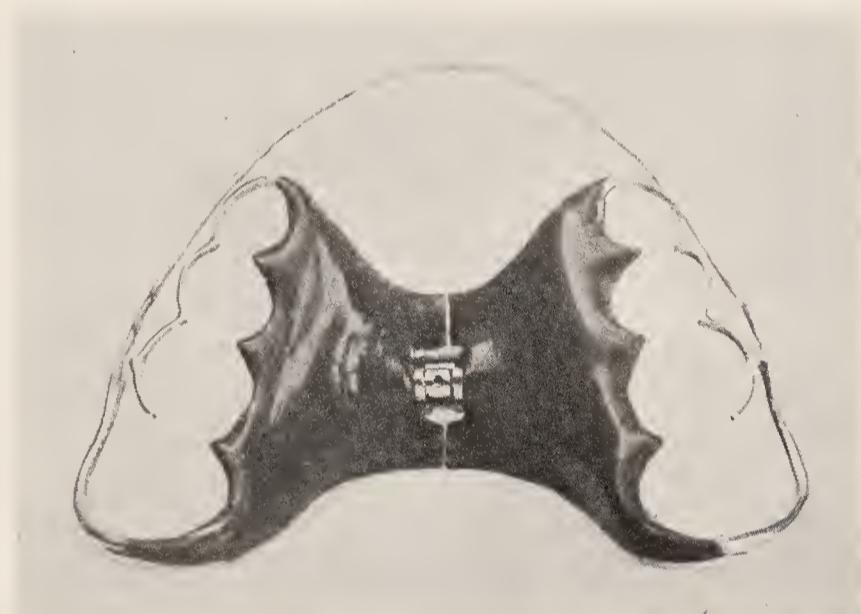
The specimens he had shown were prepared for the Museum of the International Dental Congress, but were too late to get into the catalogue, and he would therefore ask the Curator to accept them so that they might become the property of the Society. The screws were made by the Dental Manufacturing Company. As Mr. Northcroft had said, the screws were quite satisfactory for cast plates and they were good for vulcanite if the ends were well roughened or extra fastenings could be soldered to them.

Mr. J. E. SPILLER read a Paper on

### **An Unusual Case of Close Bite.**

THE case I bring forward for discussion is interesting, as it shows a condition which may be described as unilateral posterior close bite. I believe this is an uncommon irregularity and I do not remember a similar case in orthodontic literature or in my own experience.

RETENTION OF EXPANSION PLATES.



To illustrate Mr. W. Francis Mellersh's Communication.



The patient is a boy aged twelve of good physical development and excellent health. The dental arches of the parents and of one sister are normal. There have been two operations for adenoids, one in 1912 and one in October, 1914. As far as is known, all the temporary teeth were lost naturally, with the exception of two temporary molars, the identity of which is unknown. Possibly the loss of these teeth bears some casual relationship to the present condition.

All the permanent teeth are present, with the exception of the second and third molars, and they are free from caries.

The condition of the dental arches is as follows: Both arches are practically of normal dimensions, except that there is a slight narrowing of both on the left side.

Their antero-posterior relationship is normal, except that there is a considerable overbite and some proclination of the upper front teeth.

The vertical relationship is abnormal: on the right side the posterior teeth have erupted almost normally; on the left side the occlusal surfaces only of the teeth are visible in varying amount. There is a slight marginal gingivitis around the cervico-labial margins of the lower front teeth and around the corresponding portions of the posterior teeth on the left side. In this latter region the gum on the inner surfaces of the teeth exhibits a marked fibrosis extending the whole depth of the alveolar ridges. Absence of rarifying osteitis is shown by radiographic examination.

The relationship of the dental arches may vary in three directions, *viz.*, (a) antero-posterior, (b) lateral, (c) vertical.

What is usually termed "close bite" is one kind of variation of relationship in the vertical direction and I believe should always be thought of as such. Two explanations of the causation of this condition are possible, *viz.*, (a) a local cause—a sub-normal eruption of the posterior teeth, which may be due to the premature loss of temporary teeth, and (b) a developmental defect of bone associated with defective growth of the rami of the mandible. I suggest that the abnormality of the case shown is due to the former cause—a local one—but it is difficult to explain how the vertical relationship of the arches may vary unilaterally, except by a compensatory tilting inward of the posterior teeth, which is not here apparent. The excessive overbite is probably a secondary condition.

The treatment I have adopted is the insertion of a biting plate, freely cut away from the thickened alveolar ridge on the left side, and carrying a bow passing from the posterior borders of the first permanent molars around the anterior teeth, and to which are attached cleats resting on the central incisors. At the end of two weeks there is a slight improvement in the condition.

May I suggest as a postscript that there is a need of words to express movement of the posterior teeth in a lateral direction, and which would correspond to others now in use, *viz.*,

"Proclination" and "retroinclination."

"Preplacement" and "postplacement."

Replying to the President, Mr. Spiller said that the second model was taken a fortnight after the first.

Mr. SCHELLING asked whether it was not possible that the teeth were exactly in the same position on both sides, that there was no irregularity with regard to the up-and-down position, but the appearance was caused by inflammation of the gum.

The PRESIDENT considered there was some hypertrophy of the gum on one side.

Mr. NORTHCROFT said one remark of Mr. Spiller's served to elucidate the case. Mr. Spiller said that X-rays had been taken and the case reported as absolutely normal. If the teeth had not erupted they would only be showing through the bone a very short way, but if normal the X-rays would show the normal amount of process surrounding the teeth. He believed himself the teeth had erupted normally.

The PRESIDENT thought the teeth had equally erupted.

Mr. NORTHCROFT thought that for lateral inclination inwards, "medial inclination," although clumsy, was absolutely correct. Dr. Sim Wallace suggested "buccal inclination" for inclination outwards.

Mr. CHAPMAN said that in addition to hypertrophy of the gum he noticed, when the palatal aspect of the upper model was examined, a very marked increase of tissue on the left side in the region of the first and second molars. It reminded him of a case which he saw under the care of Dr. Kirk, where the amount of the swelling was very much greater and was bilateral instead of unilateral, as in the present case. If he remembered rightly, Dr. Kirk said that it was due to a very low form of inflammation, whether of fungoid origin or one of a low bacterial type he did not remember. The present case was less in intensity and occurred on one side only. He agreed with previous speakers in thinking that the teeth had fully erupted. If the gingivitis was all round the cervical margins it would support the theory that it was due to some form of inflammation.

Mr. SPILLER said the hypertrophy on the inside was of a different type from the gingivitis on the outside. On the outside it was a very casual inflammation, apparently due to a lack of masticating function.

Mr. RUSHTON said there was also slight hypertrophy on the right side.

Mr. SPILLER said it was very slight.

Mr. RUSHTON said if the hypertrophy was cured it would be found that the teeth had erupted on the one side as on the other.

Mr. STURRIDGE asked whether the hypertrophy might not have been set up by the wearing of a plate in the upper jaw for expansion.

Mr. SPILLER said not, as it was present before a plate was worn. The plate was now cut right away from the hypertrophied tissue.

Mr. STURRIDGE said it might be likely to keep up the irritation and not give the gum a chance to settle down normally round the teeth. It seemed to him that the eruption was complicated and the gum tissue had been irritated by something which was keeping up the hypertrophy. He did not think it was a case for wearing anything in the mouth.

Mr. SCHELLING said he had a case of a patient whose palatal mucous membrane was extremely hypertrophied and it was only when the patient wore an artificial plate that his gums became normal again beneath its protection. It might be that a plate would save Mr. Spiller's patient's gums from irritation.

Mr. STURRIDGE said there was the outside of the gum also to be considered where there was no plate.

AN UNUSUAL CASE OF CLOSE BITE.



FIG. 1.



FIG. 2.

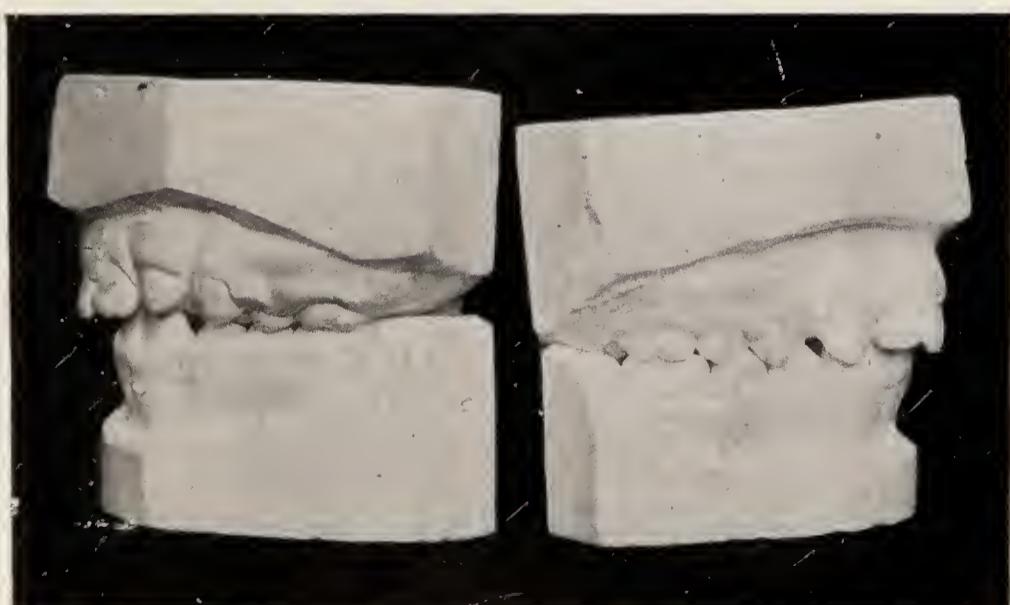


FIG. 3.



Mr. SPILLER was rather disappointed that members did not seem to think a unilateral close bite was possible. He had searched literature for it and had noticed that Mr. Norman Bennett said it might occur unilaterally, but without giving any instance of it. He was inclined at first to think this was a genuine case and as a matter of fact that was the whole interest of the case. He felt convinced that it was a real lack of eruption, because the amount of fibroid tissue appeared to be caused by long-standing irritation, such as might be expected from teeth in a state of partial eruption during a long period. With regard to the X-rays, the photographs were taken before he saw the case and he had not seen them. They showed the absence of rarefying osteitis (for which purpose the examination was made), but he had no information regarding the amount of eruption of the teeth. With reference to the inflammation, it might, of course, be due to bacterial inflammation, but in that case he would expect to see it on both sides of the mouth. As to Mr. Sturridge's question, the boy had only had the plate in for a fortnight and it was cut away freely from all places where there was inflammation, so that it could not possibly be keeping the inflammation up, and at the end of the fortnight the case had improved ; the close bite was decreasing. He would continue to use the plate and see what happened.

The PRESIDENT having thanked those who had brought forward communications, the Society adjourned until March 10th.

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## ORDINARY MEETING.

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An ordinary meeting of the Society was held at 11, Chandos Street, Cavendish Square, on Wednesday, March 10th, 1915, Mr. W. F. MELLERSH, President, in the chair.

The following casual communications were read and discussed.

### **A Case of Pre-normal Occlusion. Class III.**

By Mr. F. BOCQUET BULL.

You have all had an opportunity of seeing the patient and I may give you one or two further details. The reason I brought him up to-night was chiefly because I wanted to find out a rational treatment of the boy, apart from anything like resection of the mandible. He was fourteen years of age last December, and unfortunately from our point of view he has no brothers or sisters. There is no history of any illness apart from that of adenoids when about two years of age, which were removed at the time. There is still, however, a tendency, according to his mother, to drop his lower jaw very much when asleep, but he is not a mouth-breather.

The PRESIDENT asked whether there was any family history.

Mr. BULL said he had asked the questions but had discovered nothing abnormal back to the grandfather and grandmother on both sides of the family.

Mr. RUSHTON said that in spite of what Mr. Bull stated he thought the boy was still a mouth-breather. He had watched him rather closely and observed that he could breathe through his nose, but it was not habitual with him. His mother said that his mouth was usually open. The case was typical of those cases in which for some reason or other the mandible seemed to grow and press forward, with the ramus and body almost in a straight line. It was not a large mandible ; if measured it would probably be found less in length than the well-developed mandible with the usual angle. They would also notice that the face was extremely long and narrow. He had noticed in some war articles that the Germans were called by our men "square heads," and he thought that was very much the type of head that the Britons used to have and would still have if mouth-breathing were not so prevalent ; but mouth-breathing seemed to lengthen and narrow the face in a very considerable degree. The mother of the boy had told him that he was operated on for adenoids when he was about two years old. but she did not know whether he also had had his tonsils removed. There were no signs of any tonsils in his throat. It had been suggested that one of the causes of a mandible protruding in that way was to allow the patient to breathe more comfortably. It would be a good thing to have a photograph of the side face of the boy, as it was a very interesting case. Personally, the only treatment he should be disposed to give would be in the direction of artificial teeth.

Mr. SCHELLING thought it was a case more of irregularity of the bone than of the teeth, and it seemed beyond the limits of ordinary treatment. He did not think it was possible by any manipulation

CASE OF PRE-NORMAL OCCLUSION, CLASS III.

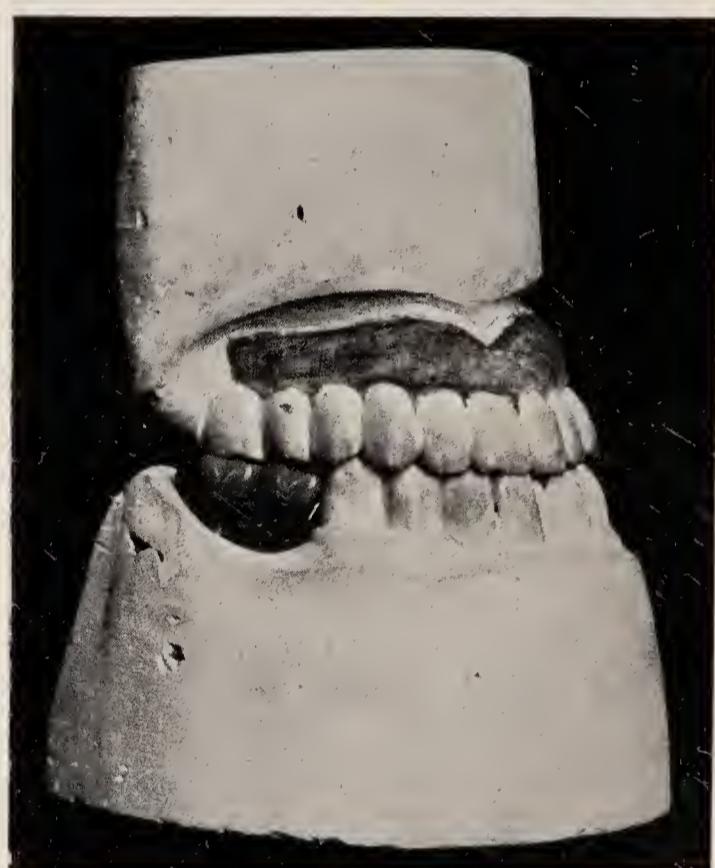


TO ILLUSTRATE MR. F. BOCQUET BULL'S COMMUNICATION.

CASE OF PRE-NORMAL OCCLUSION, CLASS III.



Natural Bite



Restoration of Articulation.



Palatal View of Plate.

TO ILLUSTRATE MR. GEORGE NORTHCROFT'S REMARKS.

of the upper teeth to get them to look natural or improve the boy's appearance. He had seen a case nearly as bad some sixteen years ago when many suggestions were made, even including excision of pieces of the jaw, to bring the chin back. The boy had now grown up and was a doctor and his rather pugnacious look tended to make his patients take kindly to any treatment he prescribed for them.

Mr. GEORGE NORTHCROFT said the chief point he had noticed about the case was the lack of function between the two jaws, the mandible being excessively large compared with the maxillæ. Although the boy was fourteen and had only had two teeth removed, he was quite convinced that in a few years the outsides of the lower molars would be marked by caries and probably periodontal disease if something was not done to make the relationship of the two jaws functionally better. Therefore the course to be adopted would be such as was suggested by Mr. Maxwell Stephens when he showed one of his cases some time ago. In order to facilitate the insertion of an artificial denture in the upper jaw over the existing teeth the laterals ought to be removed. It had also been suggested, and he thought with reason, that the inclination backwards of the incisors and canines might be accomplished by the removal of the first lower premolars which did not at present and never would function properly. As had been said, it was a case now beyond orthodontic treatment. Had the case been seen when the child was treated for adenoids it probably could have been perfectly corrected. He had shown a case of a child two years and eleven months old which he treated for Class III. He saw the grandmother the other day, who told him that the child had a perfect set of teeth and looked quite normal and that the case was extremely satisfactory.

Mr. MAXWELL STEPHENS exhibited some models illustrating a case such as Mr. Northcroft had referred to.

Mr. RUSHTON said the child's adenoids were removed at the age of two and the mother said she had not noticed any deformity until the child was changing his teeth at about seven or eight years old.

Mr. MAXWELL STEPHENS said a similar case to that he had shown had been worn for eighteen years and had never broken.

The PRESIDENT asked what was the condition of the teeth.

Mr. MAXWELL STEPHENS said there was only one molar on the right-hand side on which the platinum base was struck very tightly that had at all shown any signs of caries. The teeth were of a hard class.

Mr. M. HOPSON said he was interested in Mr. Maxwell Stephens' case, which he imagined was precisely similar to a case which he occasionally saw, that of a well-known doctor practising in the West End, who had been wearing a similar appliance for nearly twenty years. His teeth were still in good order; one or two of them had been filled, but they had not suffered to any extent.

The PRESIDENT said it was very remarkable that the teeth had not suffered. It would be interesting to know exactly what the patients used for cleansing their mouths and dentures.

Mr. MAXWELL STEPHENS said his case was that of a nurse who used a weak solution of iodine.

Mr. HOPSON said the case which he had mentioned was made of gold struck up, whereas Mr. Maxwell Stephens' case was made of vulcanite.

Mr. SCHELLING mentioned the case of a gentleman who had an extremely close bite, and many years ago Mr. Cartwright made a plate which raised the bite a quarter of an inch. He had seen the patient about every six or eight years and had raised the bite about twice

the thickness of half-a-crown by adding vulcanite. There had been no decay of the teeth whatever. The gentleman could not masticate anything without his plate. He used no particular methods of cleansing except mechanical friction with the toothbrush and ordinary tooth powder for the teeth.

Mr. RUSHTON said he had a case which differed from Mr. Schelling's. The patient was consistently dirty, but his teeth never decayed though he lost them from pyorrhœa.

Mr. CHAPMAN agreed with the previous speakers that orthodontic treatment was undesirable in Mr. Bull's case. If any treatment was undertaken it should be to bring the lower incisors into correct relationship, and that would involve either (or both) moving the lower jaw distally or moving the incisors forward. In that case he felt that the lower jaw could not be moved back at all. The patient was too old to move the incisors forward to the extent necessary ; retention would be an insuperable difficulty. The amount of movement required was enormous and the teeth would have to be moved by translation rather than by inclination. In spite of what was said about the bone-growing powers of appliances which would move teeth bodily, he should have very grave doubt as to whether there would be very much bone brought forward round the roots of the incisors if they were moved so far as to occlude correctly with the lower teeth. He took it the patient was a hospital patient, and the very least time in which any good could be done would be three years, when the patient would be somewhere between seventeen and eighteen, and probably not available for treatment at all.

Mr. BULL said he remembered hearing Mr. Maxwell Stephens' communication at the meeting of the Metropolitan Branch of the British Dental Association, and had thought of trying his method in the present case. Apparently it seemed to be the only method of doing anything. He would have much pleasure in bringing the patient up later on if the treatment was carried out.

## **A Case of Retarded Eruption Complicated by Supernumerary Teeth.**

By Mr. HAROLD CHAPMAN, L.D.S.Eng., D.D.S.Penn.

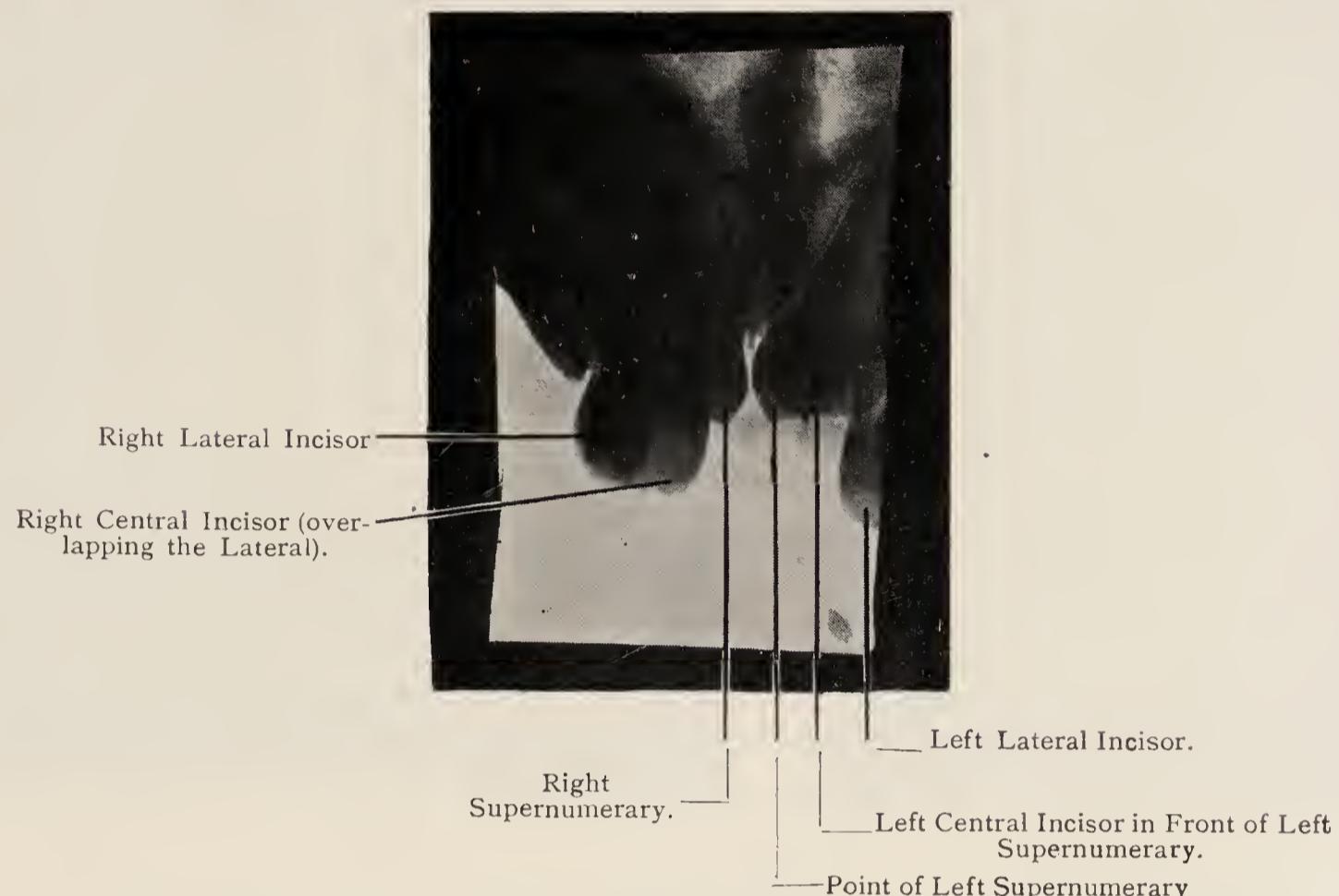
This is a case on which I was recently consulted, and it seemed to me of sufficient interest to bring to your notice. The patient is a girl twelve years of age. On examining the casts it will be seen that there is a general delay in the eruption of the permanent teeth and in particular the left central incisor is not in evidence at all.

The history of the case includes the following notes. The right central incisor erupted about twelve months ago ; the left deciduous central was removed six months ago, three-fourths or more of the root having been absorbed ; the corresponding permanent tooth has not yet appeared. The right lateral incisor erupted about five years ago ; the corresponding temporary tooth was extracted early.

The alveolar region immediately behind the upper incisors has the appearance of being more prominent than usual and in the cast shown it appears even more so than in one taken some six months or so previously.

The accompanying radiogram shows the presence of two supernumerary teeth—one on each side of the median line—immediately behind the two central incisors. I have not had an opportunity of seeing and examining this patient, so I regret not being able to give

CASE OF RETARDED ERUPTION COMPLICATED BY SUPERNUMERARY TEETH.



TO ILLUSTRATE MR. HAROLD CHAPMAN'S COMMUNICATION.

A TREATED CASE OF CLASS II., DIVISION I.



Fig. I.

BEFORE TREATMENT.



Fig. II.



Fig. III.

AFTER TREATMENT.



Fig. IV.

TO ILLUSTRATE MR. E. STURRIDGE'S COMMUNICATION.

more details of the case. The opinion I have arrived at as to the eruption of the teeth is that this may be considered normal except as regards the two centrals, which have been delayed in some way by the supernumerary teeth. It would be of particular interest to know the opinion of members on the condition, and its cause, of the particular portion of the alveolus to which I have referred and whether it may possibly be associated with any condition other than normal tissue and these unerupted teeth. I notice there are several here whom swellings—if the condition may be so called—of this character considerably interest and I especially ask them to express their views.

Mr. LEWIN PAYNE said it appeared to him to be one of those cases in which the incisors were delayed in eruption in consequence of the crowding of other teeth. The two conditions which led to delay in the eruption of incisors were, firstly, those in which there was a crowding of the teeth, and secondly, the formation of a dentigerous cyst. It might be said that that delay was common wherever any tendency to crowding occurred. In his opinion the order of eruption was that of the supernumerary and then the ordinary members of the series.

Mr. GEORGE NORTHCROFT said one interesting thing about the case was that, as well as delayed eruption, there was marked separation of the incisors, which very often occurred when supernumerary incisors were present.

## A Treated Case of Class II., Division I.

By Mr. ERNEST STURRIDGE.

Mr. STURRIDGE brought forward "A treated case of Class II., Division I.," (Angle's classification). The patient, a girl of twelve, with a history of thumb-sucking, adenoids and mouth-breathing, presented the condition shown in Fig. 1. The upper jaw was well developed and practically normal, there being only slight protrusion of the incisors. Most of the defect was confined to the lower jaw, which was undersized and very narrow (Fig. 2). The only teeth which articulated were the molars, and they were in extreme post-normal relation. The lower premolars closed inside the upper arch and the lower incisors articulated against the palate a considerable distance behind the uppers. Treatment, which was begun in August, 1912, was carried out by fixing a retraction arch on the upper teeth with spurs opposite the canines; the arch was steadied by ligaturing the premolars to it. On the lower teeth an expansion arch was attached by tube bands on the molars; there was a slight outward spring given to the arch and all the teeth were ligatured to it. Inter-maxillary force was applied by loose rubber bands passing from the spurs on the upper arch to the back of the tubes on the lower first molars. The expansion shown in Fig. 3 was accomplished by August, 1914, and the case was allowed to rest with very loose inter-maxillary bands in position until January, 1915, when the appliances were removed and retainers substituted. The appearance of the finished case is shown in Fig. 4. The occlusion of the teeth on the right side is normal, but on the left side the relation is post-normal, so that the teeth cannot be said to be in perfect relationship, but the appearance of the case is so good and the occlusion well calculated to act automatically on the permanent retention of the teeth in their present position, so that he felt satisfied with the result, which has created a great transformation in the appearance of the child.

Replying to the President, Mr. STURRIDGE said he proposed to leave the incisors as they were, as they looked very well.

Mr. F. BOCQUET BULL then read a paper.

## The Teaching of Orthodontics.

By F. BOCQUET BULL, L.R.C.P., M.R.C.S., L.D.S.

When your Secretary asked me if I would read a paper on "The Teaching of Orthodontics," I gladly answered "Yes," because I felt that it was a subject that needed discussing. However, on finding that the meeting at which the paper was to be read gave me only a fortnight's grace, my gladness was somewhat tempered, and so I must ask you to excuse me if this paper is somewhat short and scrappy. And as the subject is one better treated by discussion than by a paper, I hope that the discussion on it will be abundant and will lead to some definite points on the subject.

One had hoped that the matter would have been fully thrashed out at the recent International Dental Congress, for under Section X. the Subject of Report on the third day was "The method of teaching orthodontics to dental students." The reporters were Dr. S. H. Guilford, of Philadelphia, and M. Paul Martinier and Dr. G. Villain, of Paris. Three of the speakers were Mr. Cale-Matthews, of Birmingham, Mr. F. W. Richards, of Birmingham, and Mr. Wynne Rouw, of London. Of course, you are all fully aware of how this all fell to the ground.

The teaching of orthodontics at the present time does not, to my mind, appear to be well carried out, inasmuch as it is lumped in part and parcel, at any rate at most schools, with the rest of dental surgery, both in lectures and in clinical instruction. I do not say that the actual instruction itself is at fault, but the organization and method by which that teaching is carried out. Had I had more time in the preparation of this paper I should have written to all the schools in Great Britain and Ireland to have settled this point more definitely. I shall, therefore, be glad if you will bear it in mind this evening that I am attempting to obtain some consensus of opinion as to the better organization and best method of teaching orthodontics.

Now, all clinical teaching in hospitals is, of course, of an entirely different nature from teaching as we commonly understand the word in ordinary schools. In an ordinary school the teacher has only his students to consider. In clinical teaching in hospitals he not only has to consider his students, but also to a much greater extent his patients, and one of the cardinal points to be taken into that consideration must be the question of time. I have known one or two cases, but only one or two, where the patients liked to attend the hospital, *i.e.*, they actually found a pleasure in it, but this must be out of a total of some 500 that I have had to deal with. The others, from what I could make out, mostly grumbled at the time taken, and some refused further treatment after a certain number of attendances. I want you to make a special note of this point of time saving, because it so very largely enters into our subject, both from the point of view of student and patient. I am now going to remark on a few of the difficulties that one encounters in the combined teaching and practice of orthodontics.

I say combined teaching and practice advisedly, because the one is so dependent upon the other, and it is in that that our chief difficulty lies. Teaching by itself, or practice by itself, would run fairly smoothly, but the combination of the two in a large clinic takes on a much more serious aspect.

(A) THE STUDENT.

Under this heading are placed all those factors which tend to make the student a somewhat difficult individual to deal with.

1. Until a student has gained some slight knowledge of orthodontics I am convinced that to the majority of them it is a subject that is, to a certain extent, distasteful ; after that knowledge has been obtained then he starts to actually take an interest in his work. This, of course, does not apply to all, but certainly to a very large percentage. It is, therefore, of paramount importance to hold the attention of your student for the first few months. One can compare this rather to the mixing of amalgam, for with the first few revolutions of one's pestle the mercury and alloy take little notice one of the other ; once the amalgamation has started the rest easily follows.

2. The treatment of the majority of cases takes considerable time, probably in the student's opinion far more time than the result is worth to him. At my hospital he has to be signed up for six cases—a combined upper and lower case counting as two. I regret to say that if we waited for each man to be signed up for his six cases the period of hospital study would have to be considerably lengthened. The result is that cases have more often than not to be transferred, and I suppose to most of us it is somewhat irksome to take over other people's half-finished work. Again, he often cannot see the end of the case in sight, and as the student to a very large extent works not for the good of the patient, but directly for his own benefit, and I venture to say that he would be unwise were it not so, he is inclined to pay more attention to such work as fillings, etc., at the expense of his orthodontic operations.

Again, most students are of an age when the term "fast" is characteristic of their desires. I am only referring to their professional studies ; and so they are liable to become irritated with, and take unkindly to work that does not proceed with their idea of some rapidity.

3. A student is at a hospital for a minimum time of two years' studentship, and I suppose at most hospitals spreads his orthodontic studies over most of that period. Now, to my mind, orthodontics being a special branch of dentistry, and a difficult one too, his period of study should not commence until a much later period of his two years. I know that a good many of you will say that under those circumstances he will stand less chance than ever of finishing a case of any length. That is so, but under the scheme of teaching that I shall shortly bring forward that will be taken into consideration. These, although not all, are the chief difficulties from the point of view of the student.

We will now turn our attention to the difficulties with reference to the patient.

The hospital patient is in a great number of cases, *i.e.*, from the orthodontic point of view, sent up to be treated by a County Council

medical officer. They, therefore, have a very bad start off—they are driven to it. In some cases, of course, they come up of their own free will—these cases are far more amenable to treatment. At any rate it is desirous of starting and finishing the treatment of each patient as soon as possible, with as few visits as are necessary, or, in the same way the patients cannot see the end of the case in sight and they also think that they are not getting full value for their time and trouble in attendance. Another point which has struck me as being somewhat farcical is that although one set of officers send up these young patients for attention, another set, the teachers, apparently do all in their power to prohibit attendance—probably due to the fact that monetary grants are made on the number of school attendances ; hence the desire that every parent expresses for preferential attendance on Saturday mornings. Again, a fair percentage of orthodontic patients are of such a tender age that a parent or friend is obliged to bring them. This necessitates extra money in the way of fares, and is a fact which is grumbled at considerably. The age of these patients also renders them liable to a great number of childish ailments, and this often makes a break in their attendance, often with serious results. One, I suppose, could go on enumerating these difficulties in endless fashion, but I think that I have stated enough to show that there are such difficulties, and serious ones, from the patient's standpoint.

### I. A SUGGESTED METHOD.

That lectures in orthodontics should be separate from the lectures in dental surgery. At some schools they are already so, for instance, at the London hospital, and at Birmingham. A course of lectures in dental surgery which includes orthodontics cannot give the attention to orthodontics that that specialty rightly needs and deserves. Further, these lectures should be given during the second year of study, when the student will be better prepared to imbibe them, and not while his attention is taken up with subjects like general anatomy, physiology, etc.

### II. CLINICAL TEACHING.

At the present time at my own hospital, and doubtless at many others, the clinical teaching in orthodontics is given by the six morning dental surgeons, and by a demonstrator who attends three mornings each week. The patient is seen first at the out-patient department by the dental house-surgeon, and is then seen by the hospital almoner, who interrogates the parents as to the ability or otherwise of the patient to attend regularly and pay for necessary apparatus. This is marked down on a special chart which is despatched with the patient to the conservation room, where the surgeon for the morning prescribes the necessary treatment and talks to his dressers about the case, due notice having been taken by him with regard to the matter of payment and attendance. The case is then registered in a book specially kept for the purpose, and when there is a dresser ready for a patient notice is sent. Sometimes patients are able to receive almost immediate attention, at other times they may have to wait a matter of months. The course of treatment is then

carried out by the dresser under the supervision of the demonstrator. In the majority of cases the dental surgeon under whose care the case is does not see it again until it is brought before him for discharge. For one thing, he has not the necessary time, and secondly, the patient would always have to attend on that particular surgeon's morning, not always a convenient time, either for patient or dresser.

Also, if the progress of the case shows that the originally prescribed treatment needs revision, then it is necessary to wait until the patient and surgeon are both present and valuable time is lost. Again, under this method certain dressers are inclined to neglect their patients altogether, some do not show their patients to the demonstrator for fear of criticism, and a few who are good at their work produce their patients for regular inspection. The patients of the last category are those on whom the demonstrator is able to demonstrate. Thus, instead of having more material at his hands for purposes of teaching than he really wants, the reverse is the case and the same patients are seen over and over again. I should say at Guy's Hospital each entry of dressers is taken for three months—either for the third-sixth month or sixth-ninth month after entry, the winter entry being a large one being divided into two classes.

These classes are too large to deal with successfully. Sometimes they are as large as seventeen or eighteen men, and as I think it is the more interesting way to teach men by taking them round the chairs and showing each case individually, it is not an easy matter for every man to see the patient's mouth as one is talking. Now I said in the early part of this paper that it was essential to hold the attention of your student for the first few months of his study, and you will easily see how the above method fails to do this. Indeed, the method I have described above is, to put it in plain language, a complete failure. The period mentioned beforehand at which men hold their dressership also is wrongly timed. He is barely conversant with the ordinary conservation room work before he has to launch out into a new branch of study altogether ; a study which really necessitates a general knowledge of dentistry before being started.

This may not apply to other schools having fewer students and a smaller clinic than Guy's, but when one reduces both students and patients one also reduces materially the difficulties.

I am convinced that the only method by which the teaching and practice of orthodontics can be carried out on a large scale is to have a separate department entirely under the charge of a dental surgeon appointed solely for that purpose, aided, perhaps, by a demonstrator and most certainly by a special house surgeon. The method of procedure of practice and teaching could then be as follows. The patients would come up to the out-patient department and would be seen by the house surgeon. They would then be given a ticket to come up later to see the orthodontic surgeon at his own Out-patients. It would be an advisable thing for the surgeon to attend twice weekly, but this, of course, depends to a great extent upon the size of his clinic. At his Out-patients he would see all the new cases first and from these could select suitable cases on which to talk. At the same time he would prescribe the

treatment, and, if a fairly straightforward case, could then proceed through routine treatment by the demonstrator, house surgeon and dresser, with this proviso that the patient appeared weekly or fortnightly to be seen by the dental surgeon at his Out-patients with other old patients. In this manner a firm grip would be held by the surgeon over all his cases. The adjustment of apparatus in a certain number of the more difficult cases could be performed by the dental surgeon himself with the aid of his dressers.

I come now perhaps to the more important part of the scheme, *i.e.*, the instruction of the dressers. I said earlier in this paper that it would be better to give students a three months' dressership during their second year entirely devoted to orthodontic work, or, as an alternative, the afternoons to be entirely devoted to the work, than to have a sporadic acquaintance with the work spread over the whole two years. I should, therefore, make compulsory a three months' dressership to the orthodontic surgeon in the student's second year. This would have two good results; (1) it would speed up the work, because the student would be more expert with his fingers and, regarding dentistry, with his brains, and also for a similar reason he would learn his work more quickly. (2) An appointment of this nature, where, by regulation, a certain period, or specified time of a certain period to be devoted to this work would put out of court for the student all such excuses as attendance at other lectures or other patients, causing his absence from the clinic. During the intervening time of the surgeon's visits, the dressers would be engaged in seeing their orthodontic patients, and I am bound to say that if they saw to them regularly and properly they would be fully engaged. The surgeon would have four periods of three months each during the year, and therefore a year's entry of students would be divided into four, probably giving a workable number for instruction by the surgeon at his Out-patients. Of course, it is at this particular time of the surgeon's attendance (Out-patients) that the number of his dressers would matter, for the reason that I stated earlier—only a certain number of students can see a mouth properly while it is being described; but even at the largest schools I think a quarter of each year's entry would not be too great a class.

During this three months' dressership the student would have a varied clinic to study. He would see the new patients twice weekly and would hear his surgeon discuss these cases, and after seeing them prescribing treatment the old cases would then be seen and advice given. Thus the student would see patients in all stages, and, which is more to the point, would, under these easier circumstances, probably take more interest in and remember more about his study.

At the end of the three months a new set of dressers would come on automatically, and take over the work as a body or firm collectively and not individually as at present. There would thus be no break in the treatment of the patients, and I think that both students and patients would benefit in their particular directions to a very great extent.

Although, as I have said before, this method is applicable to schools with a large number of students and patients, there is no reason why the same scheme, with modifications, should not be applied to schools with lesser numbers.



I have not referred at all to the actual models, etc., to be used in the teaching, leaving this to the discretion of the dental surgeon in charge of the department, and as being matter great enough by itself for a separate paper.

The **PRESIDENT** said the Society was obliged to Mr. Bull for having prepared his paper on an extremely important subject. He had for a long time felt that the teaching of orthodontics was so important that to do it full justice a special department, such as had been suggested, was required. The members would be interested to hear Mr. Northcroft on the method of teaching at the London Hospital.

Mr. **GEORGE NORTHCROFT** said he had very little to do with orthodontics at the London Hospital, Mr. Chapman being the lecturer on the subject. He was glad to say that at the London Hospital orthodontics was treated as a separate subject from dental surgery, and lectureships existed in both subjects. He could not say that the teaching was unsatisfactory, but he thought the assimilation of that teaching by the student was very faulty under the present system. Mr. Bull had made an honest and very clever attempt to solve a difficult problem. Probably a clinic such as he described, in which all the students saw all the cases, was far better than the students only being interested in their own few cases, which varied very greatly in difficulty through the temperament of patients and the irregularity of attendance. A system of mechanical demonstration models might very well be introduced in all schools to explain to a student the forces that were applied and the motion produced thereby.

Mr. **FRIEL** considered that the dental curriculum was at present overburdened and very little time could be spared for the teaching of orthodontics. In Trinity College, Dublin, there were twelve lectures in one year devoted to orthodontics alone, and in the College of Surgeons sixteen, divided into two years. It was far better to give the students instruction in the elements of orthodontics and not to go into treatment. The first thing he had tried to do was to show the students normal faces and normal jaws, and for that purpose he had a number of photographs showing different types of faces and different shapes of skulls, and especially showing the arch in harmony with the skull. Then he tried to show them abnormal faces without any reference to the teeth or mal-occlusion, and endeavoured to get them to say what was wrong with the face and to say what would improve it. Then he went into the methods of diagnosing cases of mal-occlusion by means of photographs, models, X-rays and the use of instruments for determining how spaces of unerupted teeth had been closed. He also showed numerous cases on the screen and classified them and asked for the views of students. He also tried to show what had brought about the irregularities. By the time that was done there were not many lectures left to devote to the changes that occurred in bone during tooth movement or give an account of treatment. It usually happened that three lectures were left to explain the treatment of irregularities, and, of course, that was quite absurd. The whole subject of the teaching of orthodontics came to the question of dentists specializing in the subject, as doctors specialized, for instance, in eye work. They obtained a certain amount of information as to eye work in their curriculum, but had to study the subject abroad when they set up as specialists. The same applied to orthodontics. Students could learn a certain amount in the lectures, but if they wanted to practise afterwards they had to take a special course. He had taken a special course, but he felt he knew very little on the subject of orthodontics, and he did not see how many students with the small amount of teaching they got could do very much during the first few years of practice.

With regard to clinical work, he hardly allowed the students to do anything ; they watched him working in the first year. In the second year they obtained a few patients, but the patients had such a very bad time with the junior students that there was always a difficulty. It was necessary to wait until the second year before a student was allowed to work in the mouth, and very few hospital cases were ever finished in a year unless it was a very simple form of irregularity.

Mr. HAROLD CHAPMAN said that in connection with the International Congress Dr. Martinier wrote to all the dental schools in Great Britain to find out what they were doing, and if he had prepared his report it ought to contain the information required without going over the ground again.

As Mr. Friel had said, there were innumerable difficulties in connection with the teaching of orthodontics, and some of them it was almost impossible to overcome in hospital work. Whilst at hospital the great stimulus to a student's work is the desire to succeed at the qualifying examination. Any matter not directly or urgently connected with this is, not unnaturally, relegated to an inferior position. This is the case with orthodontics, of which, up to the present, only a theoretical knowledge has been acquired. So long as this obtains great advancement in the clinical teaching and practice of orthodontics is not likely to occur. Again, orthodontics is rapidly becoming a highly specialized branch of dentistry and one fails to realize how more of it can be included in an already overcrowded curriculum. Doubtless the powers that be are not unmindful of these considerations, and they may be the cause of a tacit admission, not only here, but also in America, that orthodontics is too large a subject to be adequately included in qualifying examinations.

The hospital requirements in orthodontics include the treatment of six cases, but as the treatment of the six cases could be varied infinitely it is very uncertain what really is required ; with changed conditions, the requirements need to be more explicitly expressed. The case might be treated by the extraction of a tooth or by some extremely elaborate method, and each would still be the treatment of a case. If the work required of a student were more definitely defined it might be an advantage as long as the treatment of patients is compulsory.

Mr. Bull had outlined a very admirable scheme of teaching which it would be difficult to improve upon. The greatest advantage of all was that the work would be continuous and the men would see and deal with cases in all the stages of treatment, especially in retention. It did not matter how successfully the teeth were moved, if they were not retained the case was a failure. The students therefore required to be thoroughly cognisant of the time required for retention as much as of any other part of the subject. Under the present system teaching with regard to retention practically did not exist. The very length of the operations seemed to militate against any success in hospital practice. The majority of cases took anything between two and three years—this under rather than over-estimates the time—and it was impossible to expect hospital patients to attend for that length of time. The position of orthodontics in private practice appeared to be changing ; there were fewer cases treated in the ordinary routine ; these were the simpler ones and the tendency was to hand difficult cases over to people who had specialized. It was also a matter for consideration whether all students should be compelled to do orthodontical work on patients, and in that connection it was interesting to see the state of things in America, which probably led the way in the subject. As far as his own experience went orthodontics was not compulsory in any dental school in the United States.

Mr. STURRIDGE, said he thought it was compulsory now.

Mr. CHAPMAN said he had only absolute knowledge of the University of Pennsylvania, where clinical orthodontics was not compulsory, although the teaching course and lectures were. Ten years ago one private school undertook the teaching of orthodontics, but now he believed there were two, both private concerns, in which men did nothing else but orthodontical work and had the benefit of seeing cases in different stages of treatment. Being connected with the London Hospital Dental School he felt that Mr. Bull's proposals, admirable as they were, would not satisfy him at the present time, and he should like to know whether he had any suggestions to offer for the guidance of a school which numbered its students, not in hundreds, but in tens. It had always been a problem to him whether it was really desirable in hospital practice to treat all types of cases. There were many which were exceedingly difficult, and in his opinion, quite unsuitable for hospital treatment by students; the chances of the work being successful were exceedingly remote. Therefore he thought those in charge of dental hospitals should endeavour to come to some decision as to how difficult the case should be before treatment was undertaken.

Mr. RUSHTON said that under the present system the student saw the ideas of various dental surgeons and to a certain extent could pick and choose as to which he would adopt in certain cases, and it was very well known that even experts varied occasionally. But if there were only one man in supreme command the student would probably have only one type of treatment for his case, and he should like to know how Mr. Bull would get over that difficulty.

Mr. MAXWELL STEPHENS said that a student's path should not be strewn with too many difficulties, and he was likely to become extremely muddled if he saw one man adopting one system and another man another. The student should be given a firm basis, such as Mr. Friel and Mr. Bull suggested, and he would be able then to choose for himself later on when he had further knowledge to guide him.

Mr. HOPSON was in entire agreement with Mr. Bull as to the course he had submitted as a possible solution of the many difficulties which were associated with the teaching and practice of orthodontics in the ordinary dental school. With regard to the overcrowded state of the dental curriculum, Mr. Bull's suggestion as to having a definite period in which the students should learn the subject was far better than having it spread over two years at a hospital in a haphazard fashion. He had been convinced for many years that the proper period of study for the student to take up orthodontics was in his second year; he ought not to take up orthodontics until he had done a certain amount of dental surgery and had attended a certain number of lectures on dental surgery, and above all until he was absolutely familiar with dental anatomy. For a student to attempt to learn ordinary orthodontics before he was absolutely familiar with the normal was bound to lead to failure. It was well to remember that the education of students must necessarily be progressive, from the simple to the difficult. The object of teachers in dental schools was to furnish the student with a solid foundation upon which he could build afterwards. It was absolutely useless to try and make dental experts of students in two years. It fell to his lot very frequently, especially immediately after an examination, to receive letters from old pupils asking him to give an opinion upon Mr. So-and-so who had just qualified and who was anxious to come to him as an assistant. "Is Mr. — an expert gold filler? Is he thoroughly well up in inlay work? Is he a first-class this or a first-class that?" So far he had not been asked for a first-class orthodontist, but he was sure the request would come before very long. A little while ago a man whom he knew very well indeed asked him about a student, and he replied, "With regard to Mr. — all I can tell you

is that he has had two years' clinical experience of dentistry and that, in my opinion, knowing you both as I do quite well, I can assure you with every confidence that Mr. — is far better qualified to practise his profession than you were the day after you received your diploma!" He agreed with Mr. Bull that if a special orthodontic clinic could be instituted where men would see various cases being treated in various stages, and also would see the simple and the difficult things—the difficult things probably being selected cases which were being treated by a specialist in that department—the results would be admirable. If a student could be given a real foundation upon which he could build after he left the hospital that was all that was required and all that should be attempted. He agreed with Mr. Friel when he said in effect that the best student was one who, after he had received his diploma and had attended, it might be, three or four post-graduate courses, was still conscious of his own ignorance.

Mr. BULL, in reply, said he agreed entirely with what Mr. Northcroft had said about mechanical models. He believed that D. Rutherford brought over to the recent Congress some very interesting apparatus. He agreed also with Mr. Friel and Mr. Hopson that all that could be done in the teaching of orthodontics was not much beyond the elements. With regard to what Mr. Chapman had said in reference to a school of tens instead of hundreds, all he could say was that only those cases could be taken that were required; no hospital could undertake more cases than it had accommodation for. With reference to what Mr. Rushton said, the teacher so chosen must be extremely broad-minded.

Mr. MAXWELL STEPHENS exhibited a little device of Mr. Campion's for assisting in the teaching of orthodontics.

**MR. CAMPION'S LETTER.**

Dear Sir,—I was not in town on Saturday and only received your letter this morning.

I have much pleasure in enclosing a specimen of the tray which I use in teaching orthodontics. I have satisfied myself that it is of the greatest value in making students form sound conceptions of the different effects of different types of anchorage and as a help towards modifying and making more efficient forms of appliance for particular cases under treatment.

The particular tray which I enclose is, however, not deep enough, it does not allow one to insert a long canine root and I think you will find that in the particular case here mounted that no great difference is observable between effects of stationary anchorage on the one side and reciprocal on the other. I propose now to have some trays made slightly deeper. Please notice that there are depressions at the back of the tray, one on each side, for measuring with calipers the exact positions of any tooth or teeth in the arch, so that the positions before and after placing in hot water may be exactly recorded.

I am very sorry that it is impossible for me to be present and hear Mr. Bocquet Bull's paper. The opinion to which I have slowly come myself is that in this as in most other subjects, lectures are of little use and that teaching must be clinical and experimental.—Yours truly,

**GEO. G. CAMPION.**

The PRESIDENT said the Council that evening had passed the following motion: "That the sum of fifty guineas be voted from the invested funds of the Society to the Dentists' War Relief Fund."

Mr. RUSHTON proposed that the Council's action be approved.

Mr. BULL seconded the motion, which was carried.

Mr. HOPSON as treasurer of the fund expressed his thanks to the Society.

The PRESIDENT having tendered the thanks of the Society to those who had brought forward casual communications, and to Mr. Bull for his paper, the meeting adjourned.

## ORDINARY MEETING.

A MEETING of the British Society for the Study of Orthodontics was held at 11, Chandos Street, Cavendish Square, W., on Wednesday evening, 13th October, 1915, Mr. J. E. SPILLER occupying the chair.

The minutes of the last meeting, held on March 10th, 1915, were read and confirmed.

Mr. B. Mendleson, L.D.S.Eng., 24, Upper Phillimore Place, W., was balloted for and unanimously elected a member of the Society.

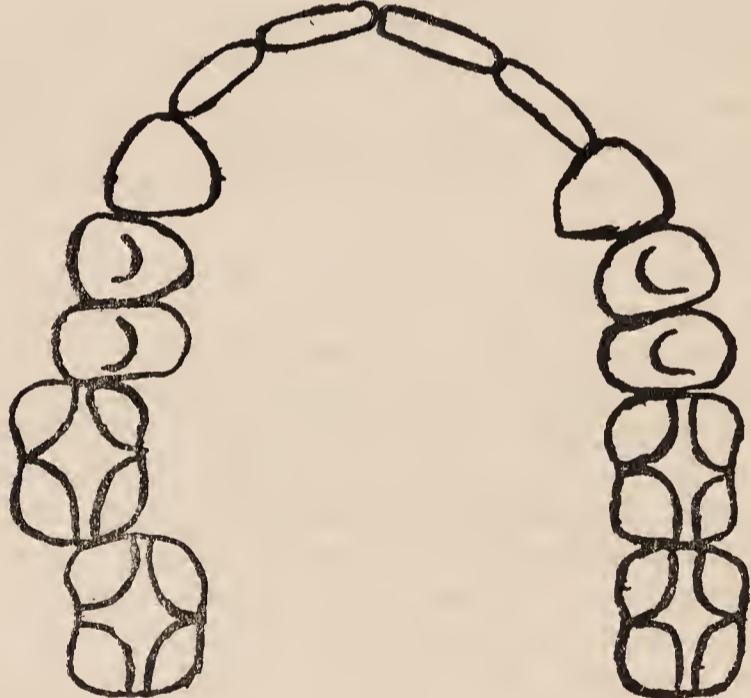
A short paper was read by Mr. HEDLEY C. VISICK.

### **An Appliance Used in Treatment of a Simple Orthodontic Case.**

By HEDLEY C. VISICK, L.D.S., D.D.S.

I BRING this communication before you to-night with great diffidence, as it may seem to some of you that it is too simple to bother about, but as the apparatus used embodies several important points I plead this as an excuse for bringing it forward.

When our energetic secretary first approached me for a casual communication I could think of nothing worth bringing forward, but on turning to a box which I keep for disused appliances, I came across the subject of this communication. I feel sure that



Left Lower Molar in buccal occlusion.

if more members of this Society were to turn for inspiration to their "disused appliances" drawer we should have some very instructive communications brought to our notice.

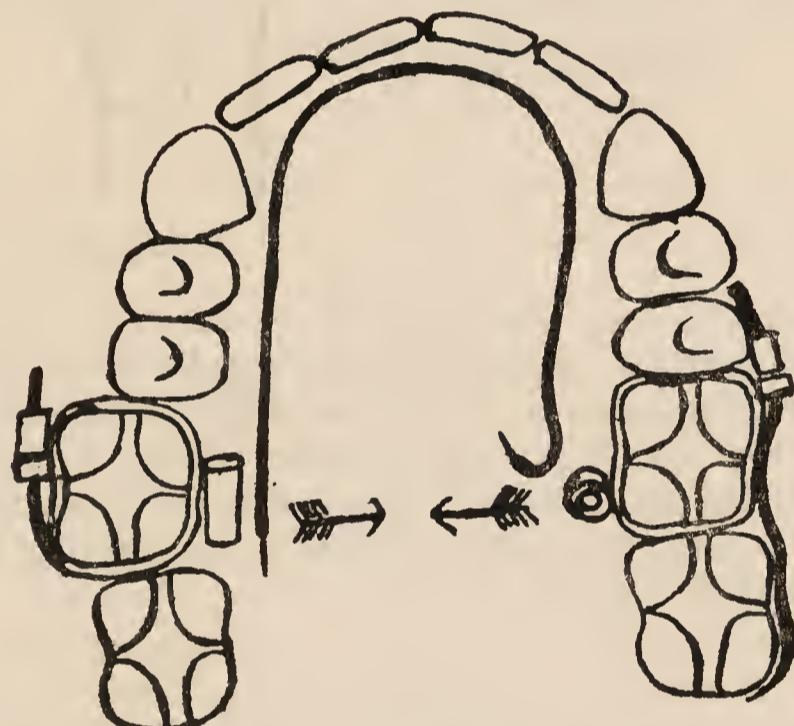
I have only brought here diagrams of the case mentioned in this communication, as it is not the case itself which I wish to discuss, but merely the apparatus used and the principles involved.

Fig. 1. We have here a case in which the lower left first molar is in buccal occlusion, this being the only tooth in either arch

which is misplaced. As the patient was at school in the north of England, and was only able to pay me about three visits before returning to school, it was necessary to put on an appliance which would be self-acting, and would need no attention.

Fig. 2. The lower first molars were banded with clamp bands, and on the lingual side of the band on the left lower first molar was soldered a horizontal tube, as shown in the diagram. The band on the right lower first molar was fitted in such a way that the threaded wire on which the clamping nut works, impinged on the buccal surface of the right lower second bicuspid, and a wire was also soldered on to engage the buccal surface of the right lower second molar. In this way a good anchorage was obtained to prevent the right lower first molar from moving lingually when trying to pull the left lower first molar into correct occlusion.

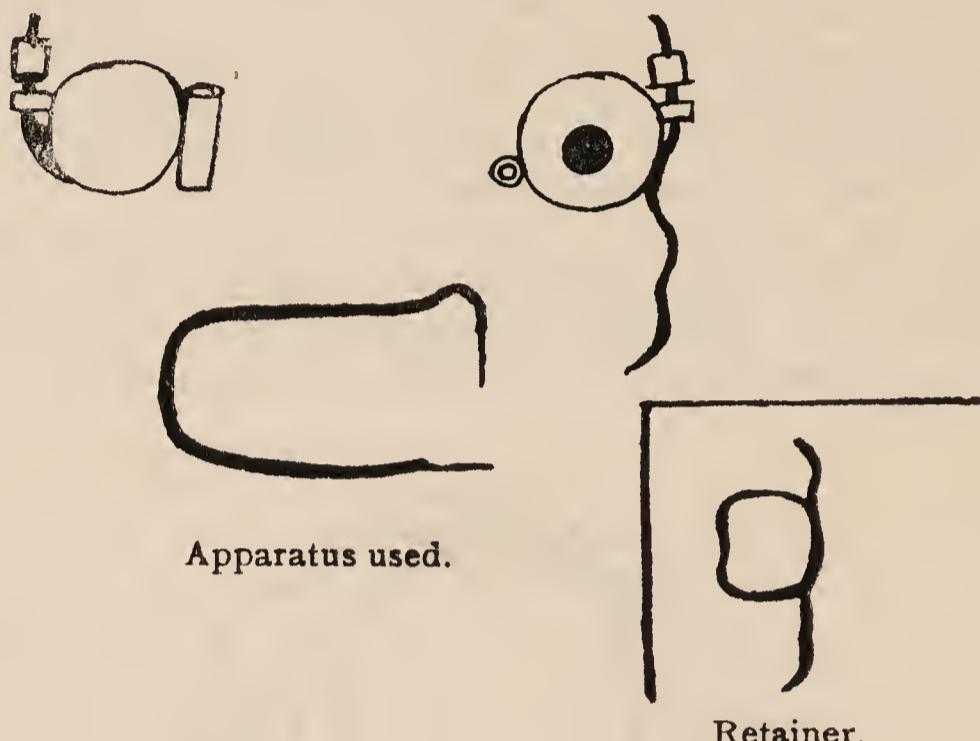
To add to this anchorage, a short vertical tube was soldered just about opposite the disto-lingual cusp of the first molar. A lingual wire was then bent up to pass through the two tubes soldered on the bands on the lower molars, and to pass round the lingual surfaces



Bands in position. Arch before insertion.

of the lower incisors. When the wire had been fitted, it was bent in such a way that it was considerably smaller than the arch, and so that when passed through the two tubes, the tendency would be for it to move the molars in the direction of the arrows shown on the diagram. To hold the wire in place in the tubes, a short length of fine gauge wire was soldered on each end of the wire arch, and when the arch was in position, these fine wires were bent over the ends of the tubes and thus prevented the dislodgment of the wire arch during mastication. You will notice that by having the tube placed horizontally on the tooth to be moved, the tooth could easily tilt inwards. By placing the tube vertically on the tooth used for anchorage, the tooth could only move bodily through the bone and could not tilt—thus greatly increasing the anchorage. This could also have been brought about by using an oval or square tube instead of a vertical tube.

Fig. 3. When the tooth had been sufficiently moved it was retained in position by means of a "pinched" band cemented in position—having a wire engaging the lingual surfaces of the second molar and second bicuspid, although, as a matter of fact, the retainer was almost unnecessary, as the tooth was held in position by the occlusion with the upper first molar and second bicuspid. I will pass round the apparatus used, but please do not be too critical of the bands used, as at the time when I did this case I was



not using the all-closing clamp bands which, of course, everyone uses now. Once more I should like to emphasize two points, *viz.*, (a) the use of a horizontal tube when tilting a tooth buccally or lingually, (b) the use of a vertical tube when using a tooth for anchorage. (c) the use of small gauge wire soldered on to the ends of the arch to retain the arch in position by bending the fine wire over the ends of the tubes.

The CHAIRMAN thought the apparatus described was very simple and ingenious. It would be of interest if Mr. Visick would state what material the arch was made of, if it sagged at all in the front part of the mouth, and also if the patient resented its use in any way.

Mr. NORTHCROFT thought it was necessary to bear in mind that there was no stable anchorage on the second premolar or the second molar to prevent their moving inwards.

Mr. HAROLD CHAPMAN asked what material the arch and the extension wire were composed of, and what gauge wire was used. He thought the idea of using vertical and horizontal tubes in combination was a very good one indeed. It occurred to him, however, that if the ends had to be turned round they might be a source of irritation, which might be avoided by using the attachment or the locking arrangement that Mr. Freil exhibited to the Society. There was another method which could be adopted ; it was the principle of the locking of the pins on the new Angle appliances, which had a little notch cut at their extremity, which was then slightly bent over. He had used them successfully with thick wire although he did not think it was so applicable as with that of 21 gauge.

Mr. H. C. VISICK, in reply, said the apparatus described in his communication was made some years ago, and he was not at the time using the all-closing clamp bands which everybody now employed.

He used nickel silver appliances throughout. The Chairman had asked if the wire sagged at all in the front of the mouth ; this was prevented by the use of the horizontal tubes on the lower left first molar. The patient did not at all object to the apparatus ; in fact, after the first day he seemed quite used to it. Mr. Chapman had asked if the point on the wire hurt the patient. He took care to bend the fine wire which passed through the end of the tube away from the tongue. Mr. Freil's locking arrangement would do in most cases. The gauge of the wire used depended on the patient's requirements of the case in hand. He simply used a piece of nickel silver wire that passed through the tubes fairly easily. The finer the wire that was soldered on the end the better, because it was more easily bent when in the mouth. Mr. Northcroft had raised a very good point in regard to the movement of the second molars inwards. Luckily neither of them did move at all ; they were locked very well by the occlusion with the upper teeth.

The Society then proceeded to hold a discussion on the report to the VI. International Dental Congress by M. Georges Villain, entitled

### **The Unification of Terminology and Classification of Maxillary Dento-Facial Abnormalities.\***

By M. GEORGES VILLAIN,

Professor of Orthodontics, l'Ecole dentaire de Paris.

*(The small figures in the text refer to the bibliography at the end of the article.)*

WHEN the officers of Section VI. of the Sixth International Dental Congress honoured me with the request to present a report on "The Unification of Terminology and Classification," I considered it a duty to undertake the task willingly, for, since 1908, I had not ceased to draw the attention of the profession to the many and great disadvantages of present-day orthopaedic terminology as a result of the use of terms which are as numerous as they are ill-conceived.

Your bureau coupled the unification of classification with that of terminology ; I congratulate it for so doing, because the one precedes the other. From a practical point of view an exact terminology cannot be selected unless the terms to be used have previously been co-ordinated according to some selected standard. Each term, by itself, should indicate the irregularity to which it refers, and so it is first of all necessary to decide on the different irregularities or abnormalities to which terms (or words acting as definitions) shall be given. To differentiate the various irregularities is to begin to classify them.

On the other hand, terminology is indispensable to classification, for the latter must co-ordinate facts, and it is therefore necessary to give to each fact a name which shall be, as far as possible, a definition.

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\* This Report was prepared by M. Villain for the Orthodontic Section of the Sixth International Dental Congress, London, 1914. The translation was made by Mr. Harold Chapman, L.D.S., D.D.S., for discussion by the British Society for the Study of Orthodontics at their Meeting in October, 1915.

## HISTORICAL.

If dental art dates back to most remote periods orthodontics is not mentioned in old documents before the first century.

Celsus<sup>1</sup> in the first century speaks of dental irregularities for the correction of which he advises digital pressure frequently repeated.

Pilny<sup>2</sup>, in the middle of the first century, refers to several cases of irregularity, but gives no treatment for them.

We next go to the 16th century to find in the annals of medicine and surgery any writings on dental irregularities ; Eustachius<sup>3</sup> speaks vaguely of them, and in 1541 Egenolff<sup>4</sup> published a book in which he advises digital pressure for the correction of the irregularity ; Dionis also published some writings at the same period and advised the same treatment ; but dental orthopædics did not actually occupy the attention of specialists until the 18th century, when Pierre Fauchard<sup>5</sup> (1728) with his great powers of observation and his great ingenuity endeavoured to correct dental irregularities by means of springs made of metal plates which were fastened to the teeth by ligatures.

The 18th century gave no indication as to the terminology or classification of dental irregularities. Fauchard (1728), Bunon<sup>6</sup> (1743), Lecluse<sup>12</sup> (1750), Bourdet<sup>7</sup> (1757), Jourdain<sup>8</sup> (1758), John Hunter<sup>9</sup> (1771), Philippe Plaffe<sup>10</sup> (1786), Wooffendal<sup>11</sup>, deal with the subject, some with the development of the arches, whilst others seek causes of malposition of the teeth and almost all discuss treatment, but none have taken the trouble to determine and still less to classify the malpositions which they observed.

On the other hand, the 19th century in this science, as in all others, is marked by a wonderful spirit of research. Early in the century Fox<sup>13</sup> (1803) attempted to classify irregularities ; he made no choice of words to describe them, but divided them into :

1. Abnormalities of the lower jaw.
2. Abnormalities of the upper jaw.
3. Abnormal arrangement of the teeth.

Fox seems to have been guided chiefly by æsthetics.

Catalan<sup>15</sup> (1826) sought to correct irregularities, including the antero-posterior relation of the jaws. He devised the inclined plane, but said nothing about classification ; Meckel<sup>16</sup> (1824) and Blandin<sup>17</sup> (1836) dealt with dental irregularities, but had no thought for their classification. Kneisel<sup>18</sup> (1836) saw further and examined the relationship of the teeth to one another in the same arch as well as that of the arches to one another. He divided irregularities thus :

- (1) Partial (irregularity of individual teeth).
- (2) Complete (abnormal relation of the arches to each other).

Lefoulon<sup>19</sup> (1839) was the first to recognise the utility of expanding the arch ; he devised an apparatus for this purpose, but was silent with regard to terminology and classification.

J. M. A. Schange<sup>20</sup> (1842), of whom we make special mention because he was the first to introduce the expansion arch of which modern appliances are only modifications, was also the first who sought to endow our art with an orthopædic terminology and classification.

Just as Fouchard is considered the father of dentistry, Schange must be considered the father of dental orthopædics.

Schange recognised the four following varieties of irregularities :

- (1) *Abnormalities in number.*
- (2) *Abnormalities of form.*
- (3) *Abnormalities of position* ; Migrations, Transpositions.
- (4) *Abnormalities of direction* ;
  - (1) Abnormalities of direction of individual teeth ; obliquities.
  - (2) Abnormalities of relation of the dental arches ; protrusion, retrusion, inversion.
  - (3) Abnormalities of occlusion.

The fourth variety of Schange particularly attracts our attention : "The varieties which the teeth may present in the relation of their direction are undoubtedly the most frequent, and at the same time those which most merit our attention because they are those which are most amenable to surgical treatment. These varieties are of two kinds, according as to whether they consist in abnormality of direction of the teeth themselves or in an abnormal relationship of the dental arches to one another.

"The former, those which depend on simple change in the direction of the teeth, are divided into *anterior*, *posterior*, *lateral* and *rotary* obliquities. . . . The varieties of direction of the second class, those which depend on the abnormal relation of the arches to each other, have been given the name of protrusion, retrusion, etc. Finally, from the combination or simultaneous existence of several or all the deformities just outlined and classified, there results an arrangement which is termed *engrenement* (interdigitation of the cusps).

"It is one of the most obstinate of the abnormal conditions which dental art has to overcome; . . ." Schange, in his book, has accurately described the occlusion of the teeth both buccolingually and medio-distally; it is unfortunate that these works have not afforded greater inspiration to those who have concerned themselves with orthodontical classification and terminology since their publication.

Carabelli<sup>16</sup> (1844) classifies teeth according to the occlusal relationship in the incisor region, thus :—

- (1) *Mordex normali* = normal occlusion.
- (2) *Mordex rectus* = edge to edge bite.
- (3) *Mordex apertus* = open bite.
- (4) *Mordex prorsus* = protruding bite.
- (5) *Mordex rétrorsus* = retruding bite.
- (6) *Mordex tortuosus* = cross bite.

Chaplin A. Harris<sup>17</sup> (1855) (6th edition) describes irregularities thus :

- (1) Deviations outwards.
- (2) Deviations inwards.
- (3) Protrusion of the lower jaw.

Tomes<sup>18</sup> (1859) does not speak of classification, but describes irregularities without naming them.

Veldt<sup>19</sup> (1870), Harris and Austen<sup>20</sup> (1873) do not bring any new facts to our notice. Magitot<sup>21</sup> (1877) amplifies the classification of Schange by dividing dental abnormalities into nine varieties.

- (1) *Abnormalities of form.*
- (2) *Abnormalities of size.*
- (3) *Abnormalities of number.*
- (4) *Abnormalities of position*; simple transposition; displacement by migration; congenital displacement.
- (5) *Abnormalities of direction*; backwards, forwards, lateral inclination, axial rotation.
- (6) *Abnormalities of eruption.*
- (7) *Abnormalities of nutrition.*
- (8) *Abnormalities of structure.*
- (9) *Abnormalities 'de dispositions'*; union of two germs or division of a single one.

Only a portion of the fourth variety and all the fifth have any interest for orthodontists, and on that point alone was any advance made by Magitot over the classification which Schange had elaborated thirty-five years previously. On the other hand Schange was more complete, he pointed out and classified abnormalities of relation of the arches as well as of interdigitation of the cusps; the terms which Schange adopted to describe the irregularities, to which he had drawn attention, were more rational than those of Magitot. Certainly Magitot had no desire to make an orthodontic classification, and if we regret that he was not sufficiently inspired by the work of Schange on the variety of abnormalities which interest us, we deplore the fact that other authors, such as Gaillard<sup>20</sup> (1881) and Andrieux<sup>21</sup> (1884), hypnotized by Magitot's authority, relied on the work of the latter when elaborating an orthopaedic terminology and classification which considerably delayed the evolution of orthodontics. Gaillard and Andrieux did not entirely disregard the work of Schange; the former applied the principle of Schange's arch whose anchorage he modified by replacing the ring with metal bands; however, it was not progress. Andrieux, whilst supporting Magitot's classification, introduced some of Schange's terms. He would have done better to preserve the classification and terminology of the latter intact.

In England, Oakley Coles<sup>22</sup> (1880) sought a classification of deformities of the maxilla, but this classification is only partial.

Redier<sup>23</sup> proposed a general classification which only differed from Magitot's in its arrangement, but he gives more importance to irregularities *par disposition* by introducing abnormalities of the interdigitation of the cusps (*engrènement*).

Iszlay,<sup>24</sup> first in 1881, and later in 1891, in a work entitled "Some notes on the nomenclature of different articulations," in which he deals with the occlusal relation of the six front teeth with their antagonists and with the inclination of the teeth arising from these malocclusions, calls the relationship of position of the teeth "Odontharmosis."

Odontharmosis is divided according to the way in which the lower anterior teeth occlude with their antagonists in the maxilla:

- (1) *Enarmosis* = the lower teeth occlude inside the arch formed by the upper teeth.
- (2) *Epharmosis* = the lower teeth occlude outside the arch formed by the upper teeth.

(3) *Prosarmosis* = the lower teeth occlude with the cutting edge of the upper teeth (edge to edge bite).

(4) *Opharmosis* = the lower teeth do not touch the cutting edges of their antagonists (open bite).

(5) *Dicharmosis* = cross bite.

(6) *Tyrpharmosis* = mixed occlusion, which cannot be placed in any of the preceding classes.

*Enarmosis* and *epharmosis* are subdivided into :—

(1) Dys- {enarmosis epharmosis} = Excessive over-bite.

(2) Di- {enarmosis epharmosis} = Absence of contact in the horizontal direction.

(3) Dys-di- {enarmosis epharmosis} = A combination of 1 and 2.

*Prosarmosis* and *opharmosis* combined with *epharmosis* and *enarmosis* form two sub-divisions for each of these classes.

This classification and terminology, very interesting in themselves, and which have the merit of being the first in point of time to be based on the relationship of opposing teeth, only include a portion of dental irregularities (antero-posterior and vertical malocclusions). It is true they might be easily completed and serve for a basis for the classification of malocclusions ; unfortunately the terms borrowed from the Greek have a very restricted use, and we prefer those used at the present time in dental nomenclature.

Farrar,<sup>22</sup> in 1888, published a voluminous work on dental irregularities and their correction, in which nothing is said of their classification ; two pages are, however, reserved for nomenclature. Farrar takes as a basis the line of the arch, and he describes irregularities according as they deviate forwards or backwards, inside or outside, to the right or to the left of the position which the tooth should normally occupy in the line of the arch ; in addition, he points out that the tooth may be displaced entirely or may be inclined.

Farrar is therefore the first to give us an exact method of determining dental irregularities by means of a given line, the parabola of the arch ; this same method controlled the elaboration of the American dental nomenclature universally adopted after the report which Black made on this subject to the International Congress at Chicago in 1893.<sup>23</sup>

Sternfeld<sup>24</sup>, in 1888 and 1891, treats of the different forms of occlusion and abnormalities of occlusion. In Sternfeld's classification the term "gnathia" indicates the upper jaw, whilst "généia" indicates the mandible ; "ortho," "opistho" and "pro" indicate respectively the position of the teeth :—correct, backwards, forwards.

This author recognises two kinds of occlusion, one physiological or ethnological, and the other pathological, but being inspired by anthropological writings he first describes four classes of normal occlusion :

(1) *Orthognathia dentalis* = normal occlusion.

(2) *Prognathia ethnologica* = superior or bi-maxillary prominence with normal occlusion.

(3) *Orthogénéia ethnologica* = edge to edge occlusion.

(4) *Progénéia ethnologica* = inferior prominence.

Pathological occlusions include six classes :—

- (1) *Prognathia pathologica* = superior protrusion.
- (2) *Orthogénéia pathologica* = pathological edge to edge occlusion.
- (3) *Orthognathia pathologica* = pathological normal occlusion.
- (4) *Progénéia pathologica* = inferior prominence.
- (5) *Opisthogénéia pathologica* = retrusion of the mandible.
- (6) *Opisthognathia pathologica* = retrusion of the maxilla.

In this classification there has been a sincere attempt to differentiate between the ethnological and pathological conditions, but from the orthopædic point of view it must be confessed that the pathological classification of Sternfeld lacks clearness and leaves out numerous details, such as the absence of occlusion, abnormal, lingual or buccal occlusion and cross-bite. The terms "*gnathia*," "*généia*," already admitted into anthropology, might however be retained ; it remains to determine their application to dento-maxillary orthopædics.

Smale and Colyer,<sup>24</sup> in their work published in 1893, do not believe in the possibility of introducing every variety of dental irregularity into a general classification. They propose the following rudimentary classification :—

- (1) *Irregularity in position of individual teeth.*
- (2) *General crowding.*
- (3) *Contracted arches* ; (a) U-shaped, (b) V-shaped, (c) saddle-shaped.
- (4) *Protrusion of the upper anterior teeth.*
- (5) *Protrusion of the lower teeth.*
- (6) *Lack of occlusion of the anterior teeth.*

Guildford<sup>24</sup> in 1889 published a work on orthodontics in which terminology and classification were not referred to.

Dubois<sup>27</sup> in 1894 published a classification of dental irregularities in which for the first time irregularities of the jaws combined with irregularities of the teeth were referred to.

Ch. Godon<sup>28</sup> publishes a general classification of dental irregularities in which he is the first to point out irregularity in the shape of the arches in relationship with dental irregularities.

P. Martinier<sup>29</sup> in 1898 relies on the classifications of Magitot, Dubois and Godon ; he uses the terms *prognathism* and *opisthognathism*.

This terminates the list, which we believe to be complete, of authors who have treated dental irregularities from the orthopædic point of view before the 20th century.

We have voluntarily omitted the names of Kingsley, Coffin, Gaine, Dwinelle, Redmond, Magill, Richardson, Francis Jean<sup>34</sup> and others, because these authors, who have almost exclusively occupied themselves with the treatment of irregularities, have, without exception, contributed to retarding the advancement of dental orthopædics by the introduction of appliances as diverse as they are numerous, which, if they signalize the ingenuity of each of their inventors, were evidently inferior in conception and action, as well as in efficiency, to the principle of the appliance which Schanze had invented.

We have also left unmentioned certain anthropological writers whose works or classifications, if they refer to the dental system,

cannot be taken into consideration by orthopædists. Anthropologists have for their object :—The study of the different human varieties called races and that of man considered in his entirety, in his details and relations as a group, whose differences and analogies with the most similar groups of the mammalian class they wish to know.

As will have been noticed, orthopædic classification and terminology made little progress in the 19th century after the work of Schanze had been published.

From the very beginning the 20th century is marked by an evident desire to complete the elaboration of a classification and terminology worthy of the very advanced state of evolution which odontological science has reached.

With the dawn of this century Angle<sup>31</sup> (1899) elaborated a classification and terminology which has gone very far in contributing to the advancement of orthodontics. Although Angle's classification, based on occlusion, forms only a part of the classification we need, it has captured the whole profession and your reporter in particular by its simplicity and its basis. Inspired by the work of J. B. Davenport<sup>30</sup> (1887) on occlusion, Angle based terminology and classification on the exact relationship of two parts to one another by indicating the fixed points.

Case<sup>32</sup>, contemporaneously with Angle, produced a classification based on the relation of the teeth to the face, but, not having established any fixed points which are necessary for the determination of relationships, the former has left us with an imperfect product whose two groups, respectively sub-divided into five and fourteen classes, include all the malpositions and malformations left in the shade by Angle, but without throwing any light on them which is so indispensable to all terminology and classification.

Angle enjoys clearness but is incomplete ; Case is more complete but lacks precision.

It is not surprising then that investigators have attempted, by uniting the two classifications, to establish one which should permit them to diagnose and describe irregularities amenable to orthopædic treatment.

Welcker<sup>33</sup> (1902) divides so-called abnormalities of articulation into:

- (1) *Labidodont* = like pincers.
- (2) *Psolidodont* = like scissors.
- (3) *Stegodont* = an increase in height of the inter-maxillary bone.
- (4) *Opisthodont* = lack of contact of the incisors in the horizontal plane.
- (5) *Hiatodont* = open-bite or absence of contact in the vertical plane.

This classification may be useful from the anthropological view, but from that of orthopædics it has no value.

De Croes<sup>30</sup> (1903) divides irregularities into :

- (1) *Abnormalities of the jaws* : (a) of form, (b) of size.
- (2) *Abnormalities of the dental articulation* : (a) crowding ; (b) open bite ; (c) protrusion of the upper teeth ; (d) prognathism.
- (3) *Abnormalities of the teeth* : (a) in position ; (b) in direction.

In this particular classification, which is most incomplete and confused, one is led to ask why opistognathism (retrusion of

the upper teeth) and prognathism, hitherto considered as abnormalities of form or development of the jaws, are included with abnormalities of articulation.

J. Sim Wallace<sup>39</sup> brings together in 1904 several communications published in 1900 in the *Journal of the British Dental Association*, and in 1903 in the *DENTAL RECORD*; in these papers he attempts to base a classification on the ætiology of irregularities and malformations. According to this author the majority of abnormalities are associated with the shape of the tongue, whose development and size are in relation to alimentation.

The classification of Sim Wallace includes three principal groups :

- (A) *Normal tongue.*
- (B) *Small tongue.*
- (C) *Large tongue.*

(A) *Normal tongue* (normal palatine vault, normal jaws) : Defective development of the teeth—upper incisors spaced, irregularities of the lateral incisors without loss of space. Simple mechanical misplacement due to external forces.

(B) *Small tongue* (lack of development of the jaws, narrow palatine vault, teeth overlapping and crowded) : Prolonged retention of the deciduous teeth—without or with increase of the natural curves of the arch or with diminution of these curves.

(C) *Large tongue* (large palatine vault) : Open bite. General anterior and lateral misplacement of the teeth.

Then follow certain sub-classes which are intended to state more exactly the affected teeth or the nature of the misplacement and secondary causes.

It seems difficult to gather all irregularities into three classes, but there is a first attempt and a very interesting one from an entirely new and attractive point of view, which we owe to this author, for we think that prophylaxis or prevention depends solely upon an exact knowledge of causes and such a classification appears to us to favour ætiological research and it deserves particular attention.

Jackson<sup>37</sup> (1904) wrote a large volume on "Orthodontics and facial orthopædics" in which no attempt at terminology is to be found, and on classification the author is severely silent.

Guilford,<sup>38</sup> the author of a book on orthodontics, only devoted a few lines to orthopædic nomenclature in a communication made to the International Congress at St. Louis in 1904, and entitled "Nomenclature." He accepts the terms "orthodontics" and "malocclusion" and refers to the comparative value of the terms occlusion (associated with the prefixes : infra, supra, labial, lingual), and trusion (associated with the prefixes : in, ex, pro, re). The author suggests that our professional terms should be taken from the dead languages.

Grevers<sup>39</sup> made a very memorable study on dental orthopædics to this same Congress ; he was in favour of the classification and terminology proposed by Iszlay in 1881, to which he added individual abnormalities divided into two corresponding groups :

- (A) Abnormalities of direction.
- (B) Abnormalities of position (of the French writers).
- (A) Abnormalities of direction :

- (1) Eversion (deviation outwards).
- (2) Inversion (deviation inwards).
- (3) Adversion (deviation medially).
- (4) Diversion (deviation distally).
- (5) Rotation.
- (6) Perversion (total deviation, abnormal eruption).

(B) Abnormalities of position :—

- (1) Ectostema (situated outside the line of the arch).
- (2) Entostema (situated inside the line of the arch).
- (3) Apostema (situated distally on the line of the arch).
- (4) Parastema (situated medially on the line of the arch).
- (5) Hyperstema (situated below the line of occlusion).
- (6) Bathystema (situated above the line of occlusion).

Thus augmented, the classification and nomenclature of Iszlay assumes a particular value although still incomplete.

In 1904, Herbst<sup>39</sup> proposed a classification based on the relation of the teeth to each other in the same arch and on the relation of the jaws to each other; the first group called by the author "*Abnormalities of position in each jaw*," is divided into :

- (A) *Abnormalities in the size of the arch* ;

  - 1. Too large.
  - 2. Too small.

- (B) *Abnormalities in the shape of the arch* ;

  - 1. Too wide.
  - 2. Too narrow.
  - 3. Conical.

- (C) *Abnormalities in number* ;

  - 1. Too many.
  - 2. Too few.

The second group, "*Abnormalities in the relation of the jaws to one another*," is divided into :—

- (A) *Abnormalities in the sagittal direction* ;

  - 1. Prognathous types.
  - 2. Progenic types.

- (B) *Abnormalities in the lateral direction*.
- (C) *Abnormalities in the vertical direction*.

Unfortunately we have here two relationships; the relation of the jaws is confused with that of the arches; the relationship of the teeth to each other is not mentioned, nor are abnormalities of direction or abnormalities of position; finally, there is wanting the relation of the alveolar arches with the jaws.

Otto Zsigmondy<sup>40</sup> published in 1905 an important study on the "classification and terminology of different articulations"; it was based entirely on the work which Iszlay presented in 1891, without taking into account the modifications and additions made since by this author in collaboration with Grevers.

Georges Villain<sup>41</sup> presented to the Société d'Odontologie de Paris in 1908 and to the Fifth International Dental Congress at Berlin in 1909, an "Essay on the Unification of the Terminology and different Classifications used in Dental Orthopædics." The author divides dental orthopædics into *orthodontics*, which treats of dental abnormalities, teeth, arches and alveolar ridges and *dento-facial orthopædics*, which deals with abnormalities of the

jaws; for a basis from which to work he takes the normal relations of the different parts making up the dental system; these relations, four in number, are:—

- (1) *Relation of the teeth in the same arch to one another*;  $\frac{\text{Teeth}}{\text{Arches}}$ .
- (2) *Relation of the arches to one another*:  $\frac{\text{Arches}}{\text{Arches}}$ .
- (3) *Relation of the arches to the jaws*:  $\frac{\text{Arches}}{\text{Jaws}}$ .
- (4) *Relation of the jaws to the face*:  $\frac{\text{Jaws}}{\text{Face}}$ .

Class 1, "abnormal relation of teeth in the same arch to one another"  $\frac{\text{teeth}}{\text{arches}}$ , is sub-divided into four groups:

- (A) *Abnormality in the shape of the arches*.
- (B) *Abnormality in the direction of the teeth*:
  - (a) Movement around a horizontal axis passing through any point of the tooth: *version*.
  - (b) Movement around a vertical axis: *rotation*.
- (C) *Abnormalities of position of the teeth*;  
Translational movement parallel to the normal axis of neighbouring teeth: *trusion*.
- (D) *Abnormalities of occlusion* (vertical):  
Vertical movement about a normal axis.

Class 2, "abnormal relation of arches to arches,"  $\frac{\text{arches}}{\text{arches}}$ , is sub-divided into three groups:—

- (A) *Abnormalities of medio-distal relationship*.
- (B) *Abnormalities of bucco-lingual relationship*.
- (C) *Abnormalities of occlusal relationship*.

Class 3, "abnormal relation of arches to jaws,"  $\frac{\text{arches}}{\text{jaws}}$ , includes:

- (A) *Abnormalities of relation with normal occlusion*.
- (B) *Abnormalities of relation with abnormal occlusion*.

Class, 4 "abnormal relation between jaws and face,"  $\frac{\text{jaws}}{\text{face}}$ , is subdivided into:

- (A) *Abnormalities of shape*.
- (B) *Abnormalities of position*.

This classification is the first which takes into account all the elements making up the dental system, it implies the necessity of making all our observations from definite fixed points, facial, maxillary, alveolar and dental, in order to help the observer to determine the normal or abnormal relations of the different parts of the dental system and thus enable him to establish a sure and exact diagnosis; conceived in the spirit of the Angle classification it will include all kinds of irregularities amenable to orthopaedic treatment, and so the author of this classification borrows from Case in his desire to be complete.

The terminology employed by Georges Villain is composed of special *radicals* for each kind of abnormality; *prefixes* are used to specify the direction of the malposition; the use of

radicals and prefixes in juxtaposition permits of the most complex abnormalities being very briefly and clearly described.

The radicals for abnormalities in direction are *version*, *rotation*; for abnormalities of position, *trusion*; for the teeth, *occlusion*; *malocclusion* for the arches; *par version*, *par trusion* for the alveolar ridges; *gnathism* for abnormalities in form of the jaws; *pulsion* for abnormalities in position of the mandible.

In order to name the malpositions Georges Villain, regarding the head as a body situated in space, determines the direction of the malpositions and malformations of the jaws in relation to one horizontal plane, *vertico-hypo*, *vertico-hyper*; and in two vertical planes perpendicular to the horizontal plane; (a) a median antero-posterior plane; *pro*, *retro*; and (b) a transverse plane at right angles to the latter; *latero-hyper*, *latero-hypo*: alveolar malpositions and malformations, as well as dental malpositions and malocclusions, are named from their position on the parabola (a geometrical figure representing the form of the arch projected on a horizontal plane); deviations from this line are outside, *vestibular*: inside, *lingual*: above, *suproclusion*: below, *inocclusion*. The median point is taken as the fixed point from which to determine the malpositions on the arch; *medio*, *disto*.

At the Congress of Stomatology held in Paris in 1908, Gires<sup>48</sup> reported on the respective worth of the Angle and Case classifications. The author regarded the fusion of these two classifications as of considerable value, but he offered no suggestions as to how this should be done. Nothing original was added to the problem of classification.

De Nevreze<sup>49</sup> in 1909 endeavoured to produce a classification and a system of definitions of irregularities of the teeth and jaws based, like that of Herbst's, on the situation of the organs in relation to the four directions

*Sagittal—frontal—vertical—axial.*

The malpositions are divided into two groups, one for the teeth and the other for the jaws; each are subdivided into four classes corresponding to the four directions.

The author uses the term *version* ambiguously for dental malpositions, whether the organ is totally misplaced or simply inclined, and the term *trusion* for malpositions of the jaws. He chooses his prefixes without regard to the term intended to indicate the direction of the malposition; the prefix *latero* is to denominate frontal malpositions, *ante* and *retro* sagittal malpositions, *infra* and *supra* vertical malpositions, *medio-vestibular* and *medio-lingual* axial malpositions (the radical for which is *rotation*). The author adds suffixes to indicate the exact direction of the misplacement.

Radicals, prefixes and suffixes have been picked out indiscriminately and without definite method in the 19th and 20th centuries for describing orthopædic data. The describing of a simple malposition becomes laborious and too easily leads to confusion in the reader's mind; a vestibular or buccal malposition (Angle), for example, is described as:—Frontal malposition in linguo-vestibular latero-version in the case of a premolar or in the case of an incisor it is described as a frontal malposition in disto-medial latero-version.

In addition, this classification takes no account of abnormal relations of the arches to one another; abnormal relations of the alveolar arches with the jaws are confused with malpositions of the jaws.

Subirana<sup>16</sup> in 1909, in a treatise on orthodontics, adhered to the Angle classification, which he adopted, but replaced the terms medial and distal malocclusions by *antero-* and *postero-version*. With regard to nomenclature this author proposes the use of the radical *version* for all dental malpositions, to which the following prefixes should be added: *extra*, *intra*, *antero*, *postero*, *giro*, *infra* and *supra*. To determine the position of a tooth, Subirana uses a geometrical figure; he encloses the arch in a triangle, the apex of which is called anterior, the sides exterior and the base posterior; the line bisecting the triangle is called the internal line.

In this nomenclature the writer is concerned only with the teeth; his terminology also is incomplete; abnormalities of position are confused with abnormalities of direction or occlusion in the same radical, *version*. The terms *protrusion* and *retrusion* are used in the classification when they are not admitted into the nomenclature, and lastly the author deals with *prognathism*, *atresia* and *systolia* in two special chapters; he accepts the term *prognathism* for the maxilla and *progenia* for the mandible; he favours new terms and points out a classification of abnormality of the arches: (1) by diminution, (2) by enlargement.

But neither this special classification nor prognathism and progenia appears in the classification adopted.

M. J. Maystadt<sup>16</sup> published in 1909 an article entitled "On Nomenclature in Orthodontics," in which we have only found a few words bearing on the subject of the title. The author writes against the confusion which he says is to be found in all professional literature between the terms *prognathism* and *opistognathism* on the one hand, and the terms *protrusion* and *retrusion* on the other. The rest of the nomenclature consists in considering all abnormalities as congenital displacements divided into seven types, each having a special name; these are the same as those used by Angle to indicate the malpositions of individual teeth.

In the same year M. Huet<sup>17</sup> suggested a very simple classification. "A primary classification divided into the following large classes according as the abnormalities affect the different bucco-dental regions,

Jaws.

Dental arches and their articulation.

Teeth (crowns and roots) and their articulations."

"A secondary classification is for the purpose of determining the character of the irregularity:

Inside.

Outside.

Forward.

Backwards.

Upwards.

Downwards.

Rotation on the axis."

"In the second class are included :

Errors of eruption (impaction and too early eruption, etc.).  
 Errors in form due to defective growth (atrophy, atresia, etc.).  
 Errors of form due to misplacement of tissues (ectopia).  
 Errors of form due to deviation (towards the inside or outside, etc.).

Errors of form due to excessive growth (hypertrophy, supernumerary organs, etc.)."

In 1909, P. Robin<sup>48</sup> proposed to simplify dental nomenclature ; with this object in view he presented a system which he called "Nomenclature," but which better deserved the name of "Documentation" ; the imaginary simplification of the author consisted in graphically and verbally describing all the elements of the dental system by signs. In order to achieve the desired result the author advocated the use of geometrical and mathematical signs, more or less modified for the purpose, and other signs invented by himself ; about 100 of these are necessary. Again, it would be necessary to add the different combinations of these signs, which would multiply them indefinitely. The final result of such a simplification was a long and tedious work, whereby the data were written in signs more lengthily and less clearly than words would express ; again, it would be necessary to expect the student to possess a remarkable memory that he might write up a case by the aid of the proposed signs, without the use of a special dictionary. The following would indicate normal occlusion :—

$$I > i, D_s \geq d_s, G^s \geq g_s,$$

and can we say that that does mean normal occlusion ? As we understand it there must be signs to indicate normal occlusion in the vestibulo-lingual direction and other signs to indicate normality in the vertical direction.

The efforts of Robin nevertheless do present a certain utility from the point of view of the creation of documents for use in research and in the establishment of harmonious proportions between the different parts which make up the dental system. Such a method might render good service in a research laboratory, but is impracticable in a clinic.

All the classifications which we have reviewed, with the exception of Sim Wallace's, are based on the anatomical relationship of the organs.

In 1910, Pitot<sup>49</sup> proposed to replace this objective method by an ætiological one. The author considers that every irregularity should not only be "limited in space," as it is to-day, but that it should be "fixed in time," and he proposes to introduce, "along-side with continuity in space, subordination in time."

Unfortunately Pitot did not attempt to elaborate a classification on the new and seductive lines that he suggested.

Before the St. Louis Dental Society, in November, 1910, B. E. Lischer<sup>50</sup> brought forward a classification and terminology which was an attempt to complete the one proposed by Angle. Lischer divided the pathological conditions into :

- (1) *Malpositions of the teeth.*
- (2) *Abnormal relationship of the arches.*
- (3) *Malpositions of the jaws.*

In 1912 Federspiel<sup>51</sup> accepted the first two paragraphs of this classification, but considered the third incomplete. In April, 1912, Lischer added to his classification :

(4) *Malposition of the mandible.*

The terminology proposed by Lischer consists in using the term *version* as a radical for all dental malpositions, whether they be of direction or position ; the direction of malposition is indicated by the terms :—*labio, linguo, bucco, medio, disto, torso, supra, infra, trans and per.*

In order to designate the malocclusion the author uses the terms

- (1) *Neutroclusion* = normal medio-distal occlusion.
- (2) *Distoclusion.*
- (3) *Mediocclusion.*

The malpositions of the jaws for which Lischer adopts the radical *gnathism* are divided into

- (1) *Macrognathism.*
- (2) *Micrognathism.*

Lastly, the mandibular malpositions are :

- (1) *Mandibular anteversion.*
- (2) *Mandibular retroversion.*

Although this classification does not contain all the elements necessary to establish an exact and complete diagnosis it proves that in America, as well as in Europe, the need of accompanying the advances made by orthopædic science by the establishment of an adequate terminology and classification is recognised.

Frey<sup>52</sup> in a paper on terminology published in December, 1910, partly abandons that proposed by de Nevrezé in 1909 which he had adopted and very forcibly supported at the Société d'Odontologie de Paris. However, he retains from the terminology of de Nevrezé the three directions, used by Herbst since 1906, *viz.* ;—*sagittal, frontal, vertical.* In the sagittal direction the prefixes *ante, pro, retro, re,* are to be used ; in the frontal direction *latero, latero-hyper, latero-hypo, deduction* : in the vertical direction, *in, e, ex, hyper, hypo.*

As in the method of Georges Villain the prefixes indicate the direction of the misplacement and the radicals indicate the type of misplacement.

In order to determine the radicals Frey, whilst gradually coming into agreement with the method advocated by Georges Villain in 1908 and 1909, but opposed by him at this period, considered :

- (1) The teeth = radicals *version, gression, rotation.*
- (2) The alveolus = radical *trusion.*
- (3) The jaws = radical *gnathism.*
- (4) The temporo-mandibular articulations = radical *glissement.*

For the malpositions of the teeth the radicals are :

*version*, when the movement is around an axis, passing through the cervix \*

*gression*, when the entire organ is displaced parallel with the normal axis of the other teeth.

*rotation* when the organ is displaced by movement round a vertical axis.

\* It must be a mistake on the part of the author to have referred to the axis passing through the cervix. We are convinced that in his mind *version* means movement around a horizontal axis passing through any point of the tooth.

The author leaves completely out of consideration the relation of the arches to one another, which makes it impossible to use this terminology to describe malocclusion of the arches. In addition, the use of the three directions to diagnose malposition of organs situated on a curved line (parabola formed by the teeth in the composition of an arch) is a paradox, the direction of the misplacement of a molar (which does not leave the line of the arch) towards the median point is described by *ante* : for an incisor, *ante* means displacement outside the arch, whilst the displacement of an incisor towards the median line is called *latero*. Again, it would be necessary to add to the prefix *latero*, which indicates the frontal direction of malposition, a suffix which would enable the reader to know the direction of malposition in this plane ; for this purpose one uses one of the following suffixes, *jugal*, *palatine*, *lingual*, *right labial*, and *left labial*. For the canine, which cannot be included in either of the frontal or sagittal planes, which are the two vertical ones, one is obliged to make use of both by indicating by a figure the extent of the misplacement in each of these planes.

Solas<sup>33</sup> in 1911 published a paper in which he sought methods to guide us in the denomination of dental irregularities. His conclusions coincided with those of Georges Villain, favouring the use of the three planes in space in order to name the malpositions or malformations of the jaws and the choice of the parabolic line formed by the projection of the arch on a horizontal plane, as a guide in the naming of dental malpositions and malocclusions.

In 1908, the Société d'Odontologie de Paris, after it had heard Georges Villain's paper, "The Unification of the Terminology and the different Classifications used in Dental Orthopædics," appointed a committee to study this paper as well as others which might be presented. At the beginning of 1912, the Committee, consisting of MM. Frey, R. Lemière, and Georges Villain<sup>34</sup> presented its report to the society.

In this report the authors, adopting the views of Georges Villain, studied the malpositions and malformations according to the anatomical plan.

(I.) Within the buccal cavity :

- (1) *Dental malpositions* ;
- (2) *Abnormal relationship of the arches* ;
- (3) *Alveolar malformations* ;

which, from the therapeutic point of view, constitute *orthodontics*.

(II.) Beyond the buccal cavity :

- (1) *Malformations of the jaws* ;
- (2) *Abnormalities in the temporo-mandibular articulation*, constituting, from the therapeutic point of view, *dento-facial orthopædics*.

Every study in the domain of dento-facial orthopædics outside the limits of the mouth must be made by considering the head as a body situated in space and examined according to the three directions, length, breadth and height, which anthropologists use to define the types craniform, latiform and longiform (anthropological method). Every study in the domain of orthodontics within the mouth must be controlled by the parabola of the arch, the dental

system being considered as a geometrical figure (parabola) in relation to which the deviations are as follows :

(a) Outside (vestibular movement) or inside (lingual movement) the curve.

(b) On the curve towards the median line (medial movement) or away from this point (distal movement).

(c) Above or below the curve (vertical or occlusal movement).

The authors call this procedure the "*parabolic method*" as opposed to the "*anthropological method*."

This terminology rests on three fundamental elements :—

(A) The anatomical distinction of the skeletal portion of the jaws, of the temporo-mandibular articulation, of the teeth, of the alveolus and of the occlusion.

(B) The parabolic method for the parts included within the mouth, and which are connected with orthodontics.

(C) The anthropological method with its three directions for the parts outside the mouth, and which are connected with dento-facial orthopædics.

The element (A) gives the radicals :

*Gnathism*, for the skeletal or basilar portion of the jaws.

*Glissement* for the temporo-mandibular articulation.

*Alveolism* for the alveolar portion ; alveolism may arise by *gression* or *version*.

*Malocclusion* for the arches.

*Rotation* (movement around a vertical axis passing through any part of the tooth) for the teeth.

*Gression* (translational movement of the entire tooth, parallel to the normal axis of the other teeth) for the teeth.

*Version* (movement around a horizontal axis passing through any part of the tooth) for the teeth.

The element (B) furnishes the prefixes for orthodontics :

*Medio* : if, on the parabola, there is movement towards the median line.

*Disto* : if, on the parabola, there is movement away from this point.

*Vestibulo* : movement outside the parabola, towards the vestibule.

*Linguo* : movement within the parabola, towards the palate or the tongue.

*Hyper*, *sur* or *e* : movement above the parabola.

*Hypo* or *in* : movement beneath the parabola.

The element (C) gives the prefixes for dento-facial orthopædics :

*Pro*, *retro* : in the antero-posterior direction.

*Latero-hyper*, *latero-hypo* : in the transverse direction.

*Vertico-hyper*, *vertico-hypo* : in the vertical direction.

As presented above this terminology is in its main points similar to that presented by Georges Villain at the International Dental Congress held at Berlin, 1909, and which served as the basis for its elaboration ; the writers introduced the radical *alveolism* (by *gression*, by *version*) for alveolar malformation in place of : abnormal relation of the alveolus with the jaw by *trusion*, by *version* : they have added *hyper*- and *hypo-alveolism* : the term *trusion* is replaced by *gression* and *pulsion* by *glissement* : lastly the authors included

abnormalities due to vertical movement about the normal axis (*in-occlusion* and *sur-occlusion* of individual teeth) with abnormalities by translational movement (*gression*).

Fischer<sup>56</sup> in 1912 wrote a paper on terminology and adopted the preceding one.

In 1911 Bozo<sup>57</sup> made a critical study of classification without selecting one and without attempting to promulgate one, although the existing classifications did not satisfy him, but he rightly applied himself to seeking conditions which should control the preparation of an orthopædic classification, and he insisted on the necessity of establishing a simple and universal nomenclature. In 1913, this writer approached the problem of nomenclature and proposed a terminology, but unfortunately he did not follow the rules which he had laid down in his previous work, and he ended in giving us a guide to the examination and naming of maxillary dento-facial abnormalities amenable to orthopædic treatment, "in which are gathered together numerous prefixes and radicals," often ambiguous in meaning, and some are applied to abnormalities which, to say the least, are not amenable to orthopædic treatment: for example, dolicocephalic, brachycephalic, craniform, flexion, torsion (partial dental malformations), etc.

In 1914 Norman G. Bennett<sup>58</sup>, following the ideas put forward by Sim Wallace and Pitot, proposed an ætiological classification composed of three classes: the first including the malposition of individual teeth due to purely local causes; the second and third classes take as their principal cause "abnormal development of the osseous tissues, the causes of which are environmental or genetic."

This classification is reproduced in its entirety because it has not yet been presented to the profession, as Bennett's book is in the press at the time of writing this report.

#### BENNETT'S CLASSIFICATION.

##### I. Abnormal position of one or more teeth due to **local causes**:

- (1) Retained deciduous teeth.
- (2) Teeth of abnormal form.
- (3) Supernumeraries.
- (4) Absent teeth.
- (5) Abnormal frænum labii.
- (6) Position of crypt, and total displacement.
- (7) Thumb or finger sucking:
  - Superior proclination.
  - Inferior retroclination.
  - Open bite.
- (8) Premature loss of deciduous or permanent teeth.
  - Deciduous incisors.
  - Deciduous canines.
  - First deciduous molars.
  - Second deciduous molars—forward translation or inclination of first permanent molars.
  - Buccal or lingual inclination of canines.
  - Buccal or lingual inclination of premolars.
  - Rotation of upper incisors.
  - Imbrication of lower incisors.

## First permanent molars :

Close bite and secondary superior proclination, or secondary inferior retroclination.

Backward translation or inclination of premolars.

Deviation of centre.

## Other permanent teeth.

## II. Abnormal formation of a part or the whole of either arch due to developmental defects of bone.

(1) Conditions first showing themselves while deciduous molars are still in place.

Rotation or postplacement of upper incisors.

Imbrication or "fanning" of lower incisors.

(2) Conditions arising or further developing after loss of deciduous molars.

Buccal or lingual inclination of canines.

Buccal or lingual inclination of premolars.

Accentuation of rotation of upper incisors, or of imbrication of lower incisors.

(Lingual inclination of posterior teeth).

## III. Abnormal relationship between the upper and lower arches, and between either arch and the facial contour, and correlated abnormal formation of either arch due to developmental defects of bone.

(1) Vertical :

(a) Open bite.

(b) Close bite.

Secondary superior proclination.

(2) Antero-posterior (pre-normal or post-normal occlusion of upper or lower arch) :

(a) Normal or sub-normal.

(b) Inferior retrusion.

Inferior retrognathism.

Secondary superior proclination.

Secondary superior retroclination.

(c) Superior protrusion.

Superior dental preplacement or proclination.

Superior prognathism.

(d) Inferior protrusion.

Inferior prognathism.

(e) Superior retrusion.

Superior retrognathism.

(f) Double protrusion.

Superior and inferior dental preplacement or proclination.

Superior and inferior prognathism.

(g) Double retrusion.

Superior and inferior dental postplacement or retroclination.

Superior and inferior retrognathism.

(3) Lateral.

Labial or lingual occlusion of upper or lower posterior teeth on one side or both.

ON THE NECESSITY OF UNIFYING TERMINOLOGY AND  
CLASSIFICATION.

The historical review which has just been written reveals that in 1842 Schanze had thought out a terminology and classification of abnormalities amenable to orthopaedic treatment. Have these been improved upon in the course of years?

Side by side with the sincere and sometimes fortunate efforts to establish a terminology and classification worthy of the degree of advancement of orthopaedic science, we have seen the birth of terms badly co-ordinated whose choice has not been according to any determined methods; in addition, there are some writings in which one notices that the desire to improve matters has not presided over either the choice of words or their classification. It seems that ignorance of what had been done before their time, or their ambition, has guided many authors who have embarked on this problem during the last three-quarters of a century; and yet Schanze had, in the few terms which he chose as well as in their classification, furnished a real and logical basis which careful men might follow and perfect.

Voluntarily or involuntarily they have followed Schanze, for all the works published since 1842 (with perhaps one exception) have proceeded from the study of objective signs. Too few are those who have brought any appreciable degree of perfection to the work of their predecessor.

Some have attempted to co-ordinate and group terms which have an exact meaning, but having disdained or ignored previous work, they have shut themselves up in one part of orthopaedics and left us bribes of terminology and classification in which a few words were to describe or denominate the irregularity of which they caught sight, whilst they left in the shade an important part of what there was to be seen. By the side of those who multiplied the terms in confusion there were others who employed terms taken here and there without considering what had presided at their original choice.

What can result from such a state of things unless it is chaos, in the midst of which the beginner vainly seeks his way?

What some call white others call black; the same irregularity is called trusion here, supra-occlusion there, elongation in another place, and so on; the same author uses the same term to describe two dissimilar irregularities, confusing abnormality of position with abnormality of direction, because the method of treatment which he advocates does not permit the correction of one of these irregularities.

How can students understand? On what are the professors to base their teaching? Again, if a writer of no particular school wishes to describe a case he considers interesting to his confrères, he must, after each technical term, give its definition, in order that the irregularity described may not be confused with another.

With regard to classifications, most of them are incomplete, or do not rest on a definite basis; the headings are insufficient to bring together all the clinical facts; there is an absence of taxonomic order to guide the arrangement; the teacher cannot choose a

classification, so he must teach three or four, to the great detriment of the information given.

The lack of judgment in the choice of terms intended to describe abnormalities, or to indicate their treatment, the absence of method in the co-ordination of these terms and in their classification, have peculiarly retarded orthopædic evolution. It is for the want of adequate means of description that many authors publish the reports of orthopædic cases in which the absence of any plan in its presentation is made manifest.

For a long time we have noticed a want or insufficiency of clinical observation. These observations are indispensable for the progress of science, and for observations to be useful they must be complete, methodical, and, in particular, comprehensible to everybody everywhere.

Of all the reasons which we can invoke, the latter seems to us the most important, and it alone is sufficient for us to say that the unification of symptomatic and therapeutic terminology, as well as of classifications, is indispensable and urgent.

#### THE BASIS AND PRINCIPLE OF TERMINOLOGY.

First of all it seems necessary to choose generic terms belonging to our special science ; it is at present called dento-facial orthopædics, orthodontics, treatment of malocclusions, etc. ; the latter term is restrictive in its relation to the second, which is itself restrictive in its relation to the first, and consequently it appears indispensable to determine the extent of orthopædic action.

Abnormalities amenable to orthopædic treatment by the odontologist may concern the teeth, the arches, the alveolus, the jaws, and consequently a very important area of the face. This area includes all that portion of the face below a line drawn from the ala of the nose to the external auditory meatus ; behind, it is limited by the posterior border of the ascending ramus of the mandible.

The abnormalities with which we are concerned may be confined to abnormalities concerning the teeth and jaws ; abnormalities of the arches and alveolus may be considered as an extension of the dental or maxillary abnormalities.

Dental abnormalities are the simplest, but they may be combined with abnormalities of the jaw ; even abnormalities of the jaws have an important bearing on the regular arrangement of the teeth, and finally the ultimate consequences of dental and maxillary abnormalities are the changes they may cause in the face. The teeth and face are the extreme limits of the tissues amenable to treatment, whether directly or indirectly.

On the other hand we are not concerned only with abnormalities amenable to orthopædic treatment. The term which is to describe this particular science will have no value unless it includes the idea which we have just enunciated.

We therefore propose the generic term *dento-facial orthopædia*, which means :—“ The science which treats of the correction of abnormalities of the dental system, with which are included facial abnormalities, whether by an extension of them or as a result of them.”

Dento-facial orthopædia includes two parts ; the first treats of the correction of abnormalities of the teeth, arches and alveolus (since one depends on the other), which we call orthodontics. The second treats of the correction of abnormalities of parts in relation with the teeth ; the jaws, the temporo-mandibular articulation, and, by extension, the facial zone, as already described, and is called dento-maxillary orthopædics, because these abnormalities may entail dental abnormalities, or because they necessitate the intervention of the dentist. Maxillary-dento-facial abnormalities are revealed to us in the inharmony to which they give rise in the relation of the different organs or parts which make up the region that interests us. Therefore our terminology finds a logical basis in the anatomical study of these different elements ; the majority of authors are in agreement on this point.

Anatomically we have to study :

- (1) Within the buccal cavity—the teeth, arches and alveolus.
- (2) Beyond the buccal cavity—the jaws (basilar portion, temporo-mandibular articulation).

The study of these anatomical elements has no value from the orthopædic point of view, unless we consider their reciprocal relations or relations with the neighbouring parts, for it is those which reveal the malformations and malpositions.

These relations may be enumerated from the simple to the complex according to the order of taxonomic composition which binds the part to the whole :

Within the mouth :

- (1) Relation of the teeth to one another in the same arch  
(which is written as a fraction) : 
$$\frac{\text{Teeth}}{\text{Arches}}$$
- (2) Relation of arches to each other : 
$$\frac{\text{Upper arches}}{\text{Lower Arches}}$$
.
- (3) Relation of the alveolar portion with the basilar portion  
of the jaw : 
$$\frac{\text{Arch}}{\text{Jaw}}$$
.

Outside the mouth :

- (4) Relation of the jaw to the face : 
$$\frac{\text{Jaw}}{\text{Face}}$$
.

The anatomical relationships are established according to proportions which, within limits determined or capable of being determined, constitute the normal. The data of every deviation from the normal anatomical type must be perfectly recorded in order that it (the deviation) may be defined with exactitude.\*

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\* One method in which to establish the normal type for purposes of estimating the extent of a deviation from this normal type, is to make use of measurements. Several colleagues have recently undertaken work with the object of definitely establishing what should be considered "normal." Methods and measurements, indices, tables, appliances, have been designed by Hawley<sup>61</sup>, Campion<sup>62</sup>, Pont<sup>63</sup>, Sim Wallace<sup>69</sup>, Northcroft<sup>64</sup>, G. Villain<sup>65</sup>, Martinier<sup>66</sup>, Rushton<sup>67</sup>, Marouzé<sup>68</sup>, Ruppe<sup>69</sup>, etc., and it is now desirable to co-ordinate these various efforts and to arrange them with a definite purpose, for dento-facial orthopædics is at the present time suffering not only from lack of method, but also for want of a definite basis on which to establish a diagnosis of dento-maxillary-facial malformations and malpositions.

The sub-committee on orthopædics of the Société d'Odontologie de Paris has adopted a terminology based on the principles which we have just enunciated. The principles which govern the choice of terms in this work seem to us rational, so we reproduce them almost *in extenso*. We propose the adoption of the terminology presented by this committee, because it seems to logically condense all the elements proposed at various times by the authors already mentioned in this report, and because all the selected terms, with scarcely an exception, have been taken from the dead languages ; they are universally employed, in general scientific language as well as in our professional nomenclature.

“ Malpositions and malformations to be studied on the anatomical plan will fall under the following headings :—

(I.) Within the buccal cavity (*orthodontics*) :

1. Abnormalities of relationship :  $\frac{\text{Teeth}}{\text{Arches}}$ .

- (a) Dental malpositions ;
- (b) Malformations of the arch.

2. Abnormalities of relationship :  $\frac{\text{Upper Arches}}{\text{Lower Arches}}$  :  
Malocclusions.

3. Abnormalities of relationship :  $\frac{\text{Alveolar Ridges}}{\text{Jaws}}$  :  
Alveolar malformations.

(II.) Beyond the buccal cavity (*dento-maxillary orthopædics*) :

Abnormalities of relationship :  $\frac{\text{Jaws}}{\text{Face}}$  :

- (a) Maxillary malformations ;
- (b) Errors of the temporo-mandibular articulation.

Every study in the domain of dento-maxillary orthopædics must be made in the directions : antero-posterior ; transverse and vertical.

Every study in the domain of orthodontics must be determined by the parabola of the arch.

In other words :

(1) *Outside the mouth* (skeleton and its malformations, temporo-mandibular articulations and its errors). We regard the head as a body situated in space and examine it in three directions—from front to back, in breadth, and in height—which types anthropologists define as crassiform, latiform and longiform.

(2) *Within the mouth* (teeth and their malpositions, alveolar ridges and their malformations, arches and their malocclusions). We will consider the dental system as a geometrical figure (parabola) and we say that the deviations are :

- (a) Outside or inside the parabolic curve, towards the vestibule (vestibular movement), towards the tongue or the palate (lingual movement).
- (b) On this curve, towards the median point (medial movement), away from this point (distal movement).
- (c) Above or below this curve (vertical or occlusal movement).

Consequently a logical terminology must be anthropological for malformations of the skeleton, and for errors in the temporo-mandibular articulation ; it must be 'parabolic' (let us accept the expression) for dental malpositions, alveolar malformations and malocclusion.

This terminology will therefore rest on three fundamental elements :

(A) The anatomical distinction of the skeletal portion, of the temporo-mandibular articulation, of the teeth, of the alveolar ridges and of the occlusion.

(B) The 'parabolic' method for the parts included within the mouth and which constitute orthodontics.

(C) The method of the three directions for the parts situated outside the mouth and which constitute facial orthopædics.

The element (A) gives all the radicals :—

*Gnathism* for the skeletal or basilar portion of the jaws.

*Glissement* for the temporo-mandibular articulation.

*Alveolism* for the alveolar ridges.

*Malocclusion* for the arches.

*Rotation, gression, version*, for the teeth.

The element (B) gives all the prefixes in orthodontics :

*Medio, disto* ; if there is medial or distal movement on the parabola.

*Vestibulo, linguo* ; if, inside or outside the parabola, there are movements towards the vestibule or towards the palate or the tongue.

*Hyper, sur or e; hypo or in* ; if there is movement above or below the parabola.

The element (C) gives all the prefixes for dento-facial orthodontics :

*Pro, retro* ; in the antero-posterior or sagittal direction.

*Latero-hyper, latero-hypo* ; in the transverse or frontal direction.

*Vertico-hyper, vertico-hypo* ; in the vertical direction.

We ought to add to the element (A) in the table recommended by the members of the committee of the Société d'Odontologie, and with which we are in agreement, the radical *parabolism* for abnormalities in form of the arch, the prefixes *hyper* and *hypo* being used to determine the deformity of the parabola, whether by excess or by insufficiency ; and if one wishes to be still more precise one may localize the error exactly by adding : *inter-premolar* or *inter-molar*, etc." (See table.)

## CLASSIFICATIONS.

### BASES AND PRINCIPLES.

We have noticed in the historical summary how numerous and dissimilar are the various classifications ; the explanation is to be found in the infinite number and complexity of clinical facts which are to be met with in dento-facial orthopædics.

Most of the proposed classifications are insufficient because they do not allow the integral grouping of all the clinical facts.

As a general rule the criteria employed only permit of the classification of certain kinds of abnormalities the arrangement of which

is made without any pre-established taxonomic order. The whole difficulty of establishing classification rests in the choice of a criterion and of a taxonomic grouping. This difficulty is very greatly increased for us who have to classify facts, the origin and evolution of which are but imperfectly known.

It is evident that we have much greater knowledge of the reduction of malpositions and the correction of dento-maxillary-facial malformations than we have of their ætiology and pathogeny. Finally, we possess an extensive knowledge of the anatomy and physiology of the dento-maxillary-facial area. In these circumstances then it is not astonishing that investigators have chosen anatomical criteria which they classify according to utilitarian and therapeutic opinion. Is that sufficient? Our reply is "No."

Every developing science necessitates at a certain moment the grouping, the co-ordination, and the classification of the phenomena it is its business to study. It has need of a classification in order to progress, because a classification raises important questions and problems whose solution it prepares.

Our science is no exception to this rule. It is by the classification of the different methods used in the correction of irregularities of the teeth that our therapeutic practice has freed itself of the weighty encumbrance which in its case was the formidable collection of orthopædic appliances.

The young student found his way with difficulty through such a maze of appliances designed for one and the same purpose; most often, if he were not entirely discouraged at the very start, he sought to free himself from the chaos, and to create in his turn a new appliance. Order and method have made a clean sweep of these out-of-date operations; and to-day the student sees his way clearly, he quickly understands the way in which the desired object shall be reached, he no longer flounders about because he has only to study one system, the application of which is clearly established. Freed in this way, dento-facial orthopædics has made numerous and enthusiastic disciples in the last few years. Placed within reach of all practitioners, its evolution has become exceedingly alluring, whilst it is well-known to the public who daily receive its benefits.

The evolution and extension of orthopædic treatment is assisted at the present time because every practitioner can bring his stone to the common edifice whilst formerly it was the privilege of a few.

Our anatomical, anthropological and æsthetic knowledge allows us to judge of the importance of a deviation from normal and of the progress of its correction; it must furnish us with elements indispensable to an exact diagnosis by measurements.

Our physiological knowledge needs to be developed; the human dental mechanism has been the subject of some very interesting studies and researches; those of Bonwill,<sup>75</sup> Walcker,<sup>76</sup> Campion,<sup>77</sup> Bennett,<sup>78</sup> Gysi,<sup>79</sup> Prothero,<sup>80</sup> Balkwill,<sup>81</sup> Constant,<sup>85</sup> Christensen,<sup>87</sup> have had a fortunate effect on the evolution of prosthesis.\*

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\* If the problem of articulation has not been solved in the directions sought by these authors, but rather in that foreshadowed by G. Villain<sup>82</sup> and of which Ruppe<sup>86</sup> has brought about the first practical application, their labours will nevertheless have contributed largely to its solution.

Other authors, among whom we may mention J. B. Davenport,<sup>50</sup> C. Godon,<sup>51</sup> G. Villain,<sup>52</sup> Sim Wallace,<sup>53</sup> have studied the mechanical laws which regulate the dental system or which favour its re-establishment when the equilibrium of the forces contributing to its maintenance has been broken.

The author of this report has demonstrated<sup>54</sup> :

(1) The importance of the variation of individual mandibular movements and of the proportional amplitude of each of them in the establishment and maintenance of the individual form of the arch.

(2) That these movements are correlated with the path of the condyle, the form of the cusps of the teeth, the direction and situation or distribution of the teeth according to the appropriate frontal and sagittal curves.

All these elements play a considerable part in the establishment of certain abnormalities ; their importance should not escape us from the preventive point of view as well as that of the maintenance of the acquired result after orthopædic treatment. Sim Wallace,<sup>55</sup> has demonstrated the value of diet as a preventative or determining element in regard to dental malpositions. In a study presented to this section of the Congress<sup>56</sup> we propose to demonstrate the consequences from an orthopædic point of view of variations in the human dental mechanism as a whole, or in any of its parts, and of the necessity of extending our knowledge of dental physiology and its relations with dento-facial orthopædics.

If the study of dental physiology, from our special point of view, opens out new horizons, pathogeny has made little progress in our time ; from the prophylactic point of view we know still less, and nothing at all if we think of our ignorance of the ætiology of these abnormalities. To sum up, our special knowledge has developed chiefly along therapeutic lines and very little, if at all, along those of ætiology.

We notice that the best developed portion of our science is the very one which inspired the utilitarian idea in almost all the investigators.

If orthopædic therapeutics have rendered much service in the correction of irregularities, when they were classified in a way which we have described as insufficient, it is evident that a complete and, more important still, universal classification would yet further assist the development of this branch of our science ; but about ætiology we know little, and if, as we have seen, classification does favour the evolution of a science it seems necessary to seek means to establish an etiological classification in order to bring about the indispensable development of this branch.

Cure is good, but prevention is better, and we cannot know how to prevent irregularities if we do not know their causes.

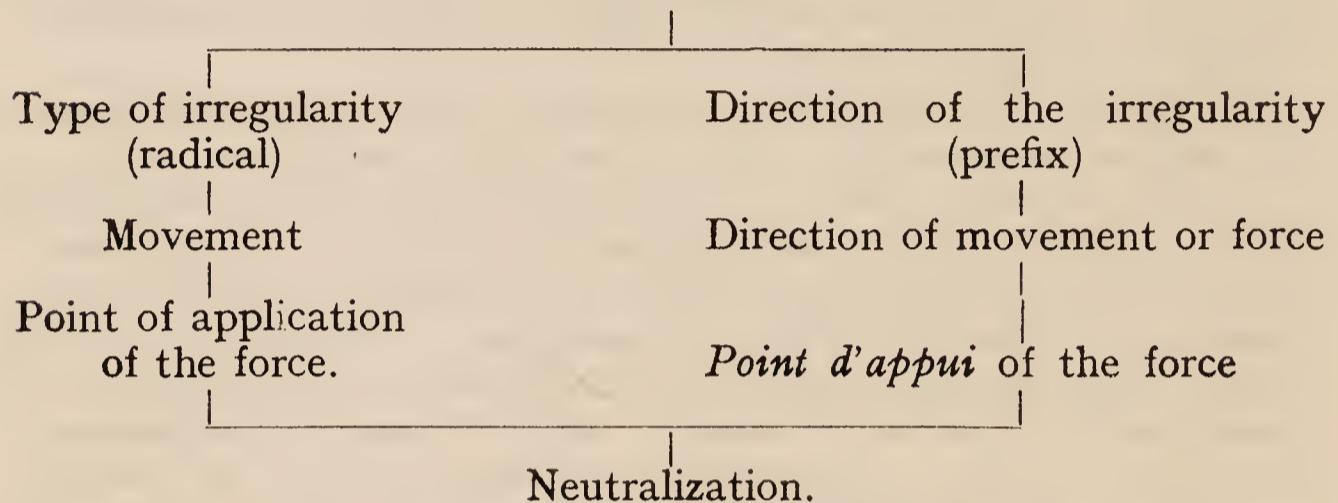
Can we include in one and the same classification these ætiological and therapeutical advantages ? The utilitarian object is different ; on the other hand, is there any necessity to have only one classification from the didactic point of view ? They both answer a dissimilar purpose, but are equally useful ; we will now endeavour to separate their reciprocal value.

## THERAPEUTIC OR ORTHOPÆDIC CLASSIFICATION.

By studying the reciprocal relations of the different elements constituting the field of action in dento-facial orthopædics we have found the elements essential to the constitution of the terminology which has already been presented ; radicals and prefixes, the first applied to types of malposition or malformations, and the second to the direction of the deviation.

The type of malposition indicates the movement which must be undertaken to reduce it. The direction of the deviation serves to guide us as regards the direction to be given to the movements or to the force to bring about its reduction.

## RELATIONS.



On the movement which has to be performed depends the choice of the point of application of the force on the organ. The direction of the force to be used guides us in the search for the *point d'appui*.

Finally, the neutralization of movements and forces serves to maintain the displaced organ in the acquired position.

Those are all the *orthopædic* elements which are necessary ; they include diagnosis and treatment (reduction and retention).

Orthopædic treatment necessitates at the outset an exact comprehension of the abnormality to be treated and for that an exact diagnosis is essential. To diagnose a case we resort to the method of relationships and in order to make those clear we have elaborated the terminology ; but is that sufficient from the didactic point of view ? To indicate the method of orthopædic treatment it is indispensable to group the different kinds of abnormalities according to their therapeutic analogies ; every other method of classification necessitates trifling repetition.

For example, the orthopædic treatment of irregularities caused by the too long retention of a temporary tooth varies according to the kind of irregularity which has resulted ; abnormality of position, *gression* (or *translation*) ; abnormality of direction, *version*, *rotation* ; abnormality of relation with its corresponding tooth in the opposite jaw, *malocclusion*.

On the other hand, from the therapeutic point of view, all abnormalities of direction by *version* are reduced by the same procedure, *horizontal axial movement*, whatever may have been the determining cause of the abnormality.

Again, every abnormality of direction by *rotation* is reduced by *vertical axial movement*.

In abnormalities of position or situation: *gression* (or *translation*) is reduced by a *translational movement*.

*Malocclusions* require *intermaxillary force*.

For *gnathisms*, *extra-buccal* appliances are used.

For mandibular *glissements*, *inclined planes* are used.

It therefore seems logical to group abnormalities amenable to orthopædic treatment according to their therapeutic analogies, and that appears to us much more advantageous than that therapeutic order should correspond to anatomical and geometrical order, which we have utilized to elaborate terminology.

This procedure has the advantage of permitting a co-ordinated grouping of all the elements which we need from the point of view of pure orthopædics.

#### ORTHOPÆDIC ELEMENTS.

Examination and Diagnosis.		Reduction or Treatment.			Neutralization.	
Classification.	Terminology.	Movement.	Force.	Point of Application.	Point d'appui.	Retention.

The clinical and didactic importance of such a grouping cannot escape anyone. Consider what such a method, though applied to malocclusions alone, has enabled Angle to realize; it has brought enlightenment and no one can deny the wonderful progress which has resulted from it. The whole profession is indebted to Angle for the leap forward which dental orthopædics has taken since 1900.

To make orthopædic classification sufficiently workable and logical we have chosen as criteria the anatomical relations of the different parts constituting the dental system. These relations have afterwards been classified in a taxonomic order of increasing complexity.

Let us sum up the principles on which this classification rests: anatomical criteria intended to group abnormalities in an order of increasing complexity, the utilitarian and therapeutic idea being predominant.

We propose the orthopædic classification which the author of this report submitted to the Société d'Odontologie in 1908, and to the Congress at Berlin in 1909, slightly modified (See table).

#### ÆTILOGICAL CLASSIFICATION.

The therapeutic or orthopædic classification of dento-maxillary-facial abnormalities which we have just established is likely to facilitate the development of orthopædic practice; it therefore answers one exact and definite purpose, for too often when a child is brought for treatment the abnormality is already complete, the irregularity is fully established, and the suppression of the initial cause, supposing we are able to determine it, cannot bring about an appreciable modification. Forces have been modified in their direction and intensity, others have appeared to compensate the different elements constituting the dental system to the new conditions established between them and to maintain their equilibrium.

To know how to correct malpositions or malformations is to increase our professional prestige, but *noblesse oblige*, and if orthopædics can be considered as a jewel in our professional crown it has created for us an imperious duty, that of suitable means to prevent these irregularities.

Thanks to the efforts of our professional national and international committees, dental hygiene is being progressively introduced amongst the masses, its importance does not escape well-informed people, certain governments have distinguished themselves by assisting in its propagation and they are wise. Thanks to the efforts of all, the dental surgeon will no longer be called in simply to intervene, but children will be entrusted to us from their earliest ages and it will be our duty no longer to cure, but to prevent.

In order to prevent an irregularity one must know the mechanism capable of producing it, and it is necessary to follow in their various stages the ways and means which favour its development, and so it will be necessary to go back to the source of production in order to discover the initial cause.

Ætiology and progress are indispensable in the study of every disease ; they are as much so in the study of the abnormalities which concern us, and if, up till now, ætiology has made little progress, it is because orthopædists have allowed themselves to be hypnotized by the wonderful results which they have been able to accomplish with the mechanical methods employed in the reduction of irregularities.

However, if we consider the results of treatment at some distance of time we notice that too frequently they become less satisfactory: every abnormality, objectively similar, is submitted to the same treatment and the reduction is always obtained, but (1) this reduction is not obtained as easily in every case ; (2) retention is longer and more difficult in certain cases.

How is it the progress of treatment is not always the same ? What is the cause of these results, which from a superficial examination are similar, but dissimilar if we go deeper ? The clinic alone can teach us.

For our own part<sup>84</sup> we have established the importance of seeking in every orthopaedic treatment the particular form of dental arch to harmonize with the cusps, with the mandibular movements, and with all the dental mechanism, individual and general, in order to shorten the treatment and, more important still, to contribute to the integral and easy retention after reduction.

The necessity of the restoration of normal occlusion to maintain a treated case in the acquired position was a revelation only a few years ago.

From the therapeutic point of view beautiful results have been obtained, but they are not all of the same value, because in treatment we have not taken sufficient account of the pathogenic evolution of the case, and we seek to correct them without removing all the causes ; their work (the work of the causes) counteracts ours and sometimes annihilates it. The clinic, whilst teaching us the progress of an abnormality, will reveal to us the progress of its treatment.

Have we sufficiently sought for psychological causes predisposing to irregularity ? Have we estimated the value of the co-efficient of heredity ?

The anatomico-pathological and pathological causes are not much better known.

It is not facts that we lack at the present time, but the clinical study of them ; we can diagnose a clearly established case of irregularity, but we do not know how to diagnose, or can only do it badly, a case in course of evolution, because the objective signs are not yet sufficiently perceptible to us and other signs are unknown to us.

It therefore appears rational to establish a classification which will promote the research for causes, their various bearings, their evolution, as well as that of the abnormality itself ; it will guide us in the correction of dento-maxillary-facial abnormalities and, what is more important still, in their prevention.

Adopting the utilitarian and preventative point of view, we propose a classification of causes capable of producing the abnormalities which interest the odontologist, and capable of favouring the grouping of dento-maxillary-facial abnormalities according to their ætiological affinities and their pathogenic qualities. (See table).

Certainly the plan of ætiological classification is far from fully satisfying us ; it has for its object the promotion of the growth of ætiological research, and it is only as new elements come to our knowledge that we can condense and group them in an ætiological classification, to which one might then give a progressive order which cannot be done at present for want of sufficiently studied and numerous clinical facts.

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Is it desirable to establish two classifications in this way ? Their fusion would appear to be greatly desired, but at the moment we do not see the possibility or the means of bringing it about.

We recognise dissimilar causes for one and the same abnormality and we always correct this abnormality in the same way.

These conditions being given, it seems that to wish to bring into one and the same classification the useful elements composing each of the classifications, ætiological and therapeutic, would risk weighting the one remaining classification and rendering it less practicable, less elastic and therefore reduce its value.

How could a student understand in the classification of one particular abnormality whose symptoms are quite clear that it could be included in several groups or classes resulting from very dissimilar causes ?

Now placing ourselves in the utilitarian didactic position, it seems that each of these classifications taken singly develops more quickly and better the judgment of students. The ætiological classification must, by indicating to them the origin and mechanism of an abnormality, facilitate for them the means of discovering and preventing it, just as with the orthopædic classification they must consider separately the treatment to reduce that abnormality when it presents itself.

When later, we have acquired in regard to ætiology and evolution of irregularities the knowledge which we at present lack, and in proportion as this knowledge develops, we shall certainly modify our methods of treatment ; doubtless by sustained attention, we shall succeed in discovering certain abnormalities before their actual appearance, and, as a result, reduce the number of our treatments ; we shall apply to certain irregularities methods of early treatment, thus avoiding the complexity of many cases and all this will facilitate the work of orthodontists ; more familiar with the evolution of other abnormalities we shall doubtless be able to apply methods of treatment appropriate to their mode of development.

Our classifications must follow such evolution and we believe that one day there will be a single classification, the utilitarian purpose of which will not be the development of any special part, but that of our science taken as a whole.

#### CONCLUSIONS.

Having reached the end of our labours we may sum them up as follows :—

The terminology and classification of dento-maxillary-facial abnormalities should be universal in order to satisfactorily fulfil their rôle in the science from which they emanate and which they are to serve.

Terminology must be simple and practical in order to be applicable to all the exigencies of the clinical description of a case, which, however complex it may be, must be clearly and easily described. For this purpose concise terms are essential to describe a clearly defined fact.

The classification must be sufficiently supple to include every clinical case which may present itself, but these cases must be grouped according to their degree of affinity in an order determined by their generic and dominant characteristics. It must facilitate the complete analysis of a case (pathological and therapeutic evolution) and retrace all its steps. A classification is, before everything, perfectible, for it must follow the science from which it emanates, and facilitate its development ; but all the efforts to perfect it must be converging, each must bring its stone to the edifice and not work along its own line, if one wishes to bring about a progressive solution, it being granted that it cannot be final.

Inspired by these ideas, and after a very deep study, which we believe to be complete, of all the works on terminology and classification of dento-maxillary-facial abnormalities, we have undertaken this report ; it has led us to the adoption of the appended tables, which we submit to the consideration of the members of the Sixth International Dental Congress.

# DENTO-FACIAL ORTHOPÆDIC TERMINOLOGY

<b>DENTO-MAXILLARY ORTHOPÆDICS</b>	<b>basilar portion</b> (malformations)	<b>Gnathism</b>	pro retro	latero-hyper latero-hypo
	<b>JAWS</b>	<b>temporo-mandibular articulation</b> (errors in)	vertico-hyper vertico-hypo	
<b>ARCHES</b> (abnormal inter-digit- ation of cusps)	<b>Glissement</b>	<b>Malocclusion</b>	pro retro	latero { left right
			medial distal	written : vestibular normal
<b>ARCH</b> (malformation)	<b>Parabolism</b>	<b>Malocclusion</b>	vestibular lingual	vestibular lingual
			vestibular linguo	normal medial
<b>ORTHODONTICS</b>	<b>Version</b> (Axial or inclinational movement round a horizontal axis pass- ing through any point of the tooth)	<b>Vertical or occlusal</b>	vestibulo hyper	vestibular linguo
			hypo	normal medial
<b>TEETH</b> (malpositions)	<b>Rotation</b> (Axial movement round a vertical axis passing through any point of the tooth)	<b>specify : coronal, radicular, corono-radicular.*</b>	vestibulo linguo medio disto	vestibular linguo medio disto
				vestibulo linguo vestibulo linguo
	<b>Gression</b> (Translational move- ment of the entire tooth parallel with the normal axis of the other teeth)		vestibulo linguo medio disto in	

medio and disto apply to the angle of the tooth most out of position; vestibulo and linguo indicate the direction of the displacement.

ALVEOLUS or ALVEOLAR RIDGES (malformations)	<i>Alveolism</i>	vestibulo linguo	specify : by <i>version</i> or by <i>gression</i> .
		medio disto	

\*The version will be radiculo-coronal if the inclination is round a horizontal axis passing, for example, through the junction of the upper fourth with the lower three-fourths of the tooth. In this case we say that the displacement is in the contrary direction of each extremity of the tooth.

## **THE THERAPEUTIC OR ORTHOPÆDIC CLASSIFICATION OF DENTO-MAXILLARY-FACIAL ABNORMALITIES.**

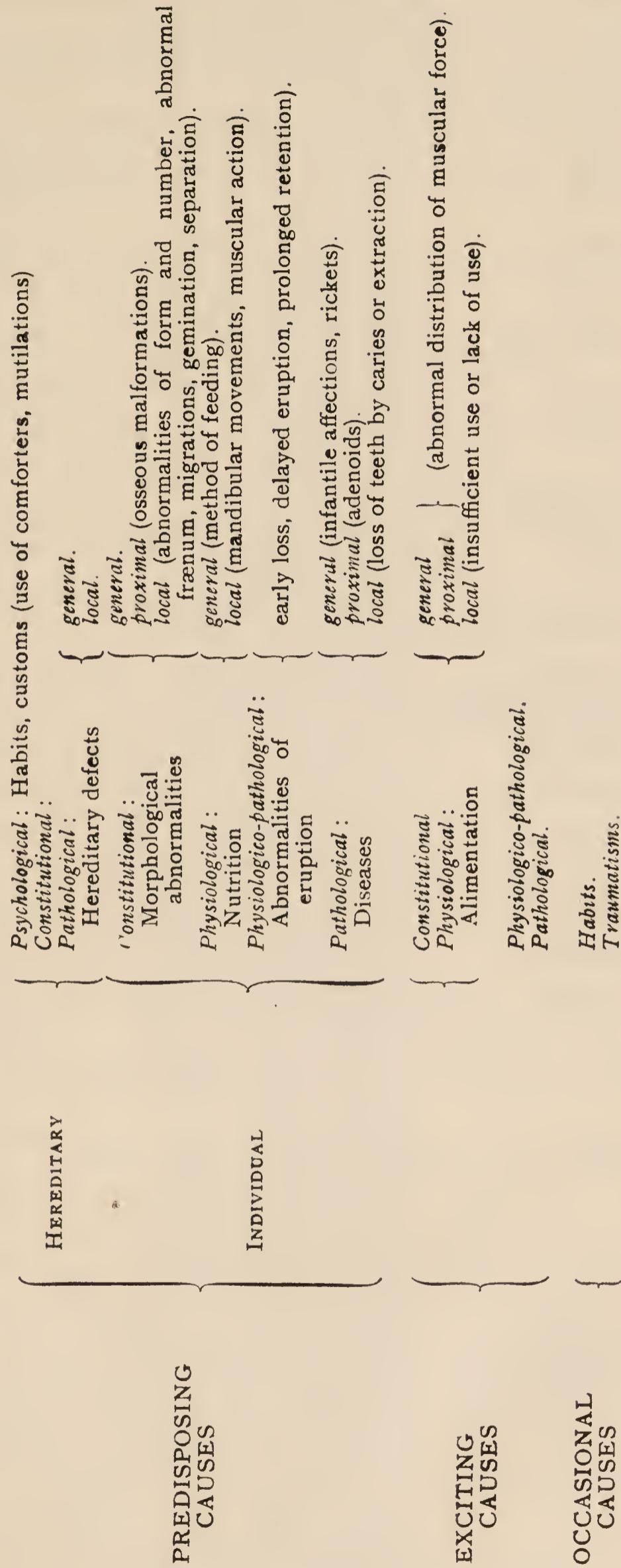
<b>CLASS I.</b> Abnormal relationship : $\frac{\text{teeth}}{\text{arches}}$	<b>CLASS II.</b> Abnormal relationship : $\frac{\text{upper arch}}{\text{lower arch}}$	<b>CLASS III.</b> Abnormal relationship : $\frac{\text{arches}}{\text{jaws}}$	<b>ORTHODONTICS</b>
Group 1 : Abnormalities of form of the arches. Group 2 : Abnormalities of direction of the teeth : (a) by version ; (b) by rotation.	Group 1 : Abnormalities of medio-distal relationship Group 2 : Abnormalities of linguo-vestibular relationship Group 3 : Abnormalities of occlusal (vertical) relationship	Group 1 : Abnormalities of relationship of the arches, the <i>occlusion</i> being <i>normal</i> . Group 2 : Abnormalities of relationship of the arches, the <i>occlusion</i> being <i>abnormal</i> .	

THERAPEUTIC OR ORTHOPÆDIC CLASSIFICATION.—(continued.)

<b>CLASS I.</b> <b>DENTO-MAXILLARY</b> <b>ORTHOPÆDICS</b>	Abnormal relationship : <u>jaws</u> <u>face</u> (due to malformation)	Abnormal relationship : <u>mandible</u> <u>face and skull.</u> (due to deviations)
} Group 1 : in one jaw only. } Group 2 : bi-maxillary.		

## ETIOLOGICAL CLASSIFICATION.

CAPABLE OF GIVING RISE TO DENTO-MAXILLARY FACIAL DEVIATIONS OR DEFORMITIES AMENABLE TO ORTHOPÆDICS.



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The CHAIRMAN said that all the members had received a copy of the report and it was therefore unnecessary that any part of it should be read. The translation from the French, a very masterly piece of work, had been made by the Honorary Secretary, who must have taken an immense amount of time and trouble to carry out the work.

Dr. SIM WALLACE, in opening the discussion, said he looked upon the report as a most elaborate and important contribution, and personally he was not equal to discussing it as it ought to be discussed. He desired to reiterate the thanks of all the members of the Society, which the Chairman had already expressed, to the translator for his excellent work. Terminology was a subject he always thought the Society should take up, and as a working basis he did not think it was possible to have anything better than M. Villain's paper, but at present he did not propose to speak about nomenclature or terminology ; he preferred to deal with one or two points in regard to classification. At one time he made an attempt at an ætiological classification, but for some years past he had thought the possibility of making such a classification was hopeless. He tried to formulate another one which was not ætiological, but it seemed to him to be just about as bad as the others that were not ætiological. He had come to the conclusion, however, that some day there would be an ætiological classification. The classification of his (Dr. Sim Wallace) to which the author referred was made ten or fifteen years ago. Since that time he had had the benefit of being a member of the British Society for the Study of Orthodontics, and had learned that there were some defects in that classification and some serious omissions. Nevertheless he was inclined to think that an elaboration and correction of that classification would lead to a classification which might be of value not only in prophylaxis but in treatment. Some of the members might remember that he made the division into tongue normal, tongue large and tongue small. Keeping still to the same kind of classification, it became evident to all that there was a group of cases where the tongue did not get the chance of being the proper stimulus to development that it ought to be, even if it were normal. For instance, if the mouth were held open, and assuming that the tongue was one of the principal developmental stimuli, the effect it ought to have on the upper arch was lost. In his first book on the subject he referred to the possibility that the hypertrophied tonsils might depress the base of the tongue and produce a similar effect to what a small tongue might be supposed to produce. But at the same time they looked at it more as the effect of the open mouth or mouth breathing. So that, in addition to the small tongue, large tongue and normal tongue, there was a displaced tongue, and that gave rise to a great group of cases that had to be dealt with—those due almost entirely to mouth breathing. Then there was another ætiological factor which he did not grasp until he became a member of the Society, namely, the effect of the imperfect correlation at an early age of the upper and the lower jaw. Post-normal occlusion had often been put down to mouth breathing, but it was difficult, if the cases were followed from a very early age, to see how that could be the case. He believed that true post-normal occlusion always originated before the fourteenth month. If the first and second temporary molars were in articulation post-normally, they would never come out of it. If they were not in that position, *i.e.*, supposing they were normal at an early age, he did not believe that mouth breathing would make them post-normal ; so that the relative position of those molar teeth remained constant. Consequently, as mouth breathing was very general after the age of fourteen months he thought it should be considered that typically and generally post-

normal occlusion did not necessarily have anything to do with mouth breathing, although he had not the slightest doubt that mouth breathing before that age would facilitate or induce post-normal occlusion. Then with regard to a small tongue, or those cases where there was general crowding, but where in a general way the occlusion was normal, it was possible to get in that particular variety what might be called a spurious or traumatic post-normal occlusion. Supposing, for example, an imperfectly developed jaw due to small muscles of mastication or small tongue ; if two premolars in the upper jaw were extracted at a certain time in all probability the first molar would come forward and to all appearances a case of post-normal occlusion would be obtained. But that was a totally different thing ætiologically from the other post-normal occlusion. He might call that a traumatic post-normal occlusion which was ætiologically truly different. He did not desire to speak about pre-normal occlusion beyond saying that in the present state of his knowledge or ignorance he was inclined to think that it might have, curiously enough, a similar origin to post-normal occlusion, but slightly different, getting the lower teeth a little too forward and bringing about what was obtained in all cases of imperfect development of the jaw, as Mr. Rushton had pointed out so clearly, an increase in the angle of the jaw. He had not the intention on the present occasion of going into the various sub-divisions that the five groups to which he had referred might be divided into ; how the various irregularities might fall under those heads ; how each of them had a more or less distinct ætiological basis, and how each in a general way gave rise to more or less distinct types of irregularities.

Mr. NORTHCROFT said that two thoughts had struck him in connection with the very complicated subject with which the paper dealt, namely, that in combination with the N. G. Bennett classification it was possible for English people, and it might be for the profession at large, to decide on a satisfactory terminology, so that conditions might be described at any rate in the same terms. Whether it was necessary at the present stage to arrive at a cut and dried classification he was a little doubtful, as he felt with Dr. Sim Wallace that some day—and he hoped it was not far distant—a satisfactory ætiological classification might be arrived at. M. Villain seemed to feel the necessity of appealing to the men who did the work, and therefore of introducing a classification which would appeal to the working side of the profession. He did not think Dr. Sim Wallace made it quite clear that there was a definite classification for his traumatic post-normal occlusion, which had always been called "false post-normal occlusion." He thought it had been recognised for years that that condition fell into Angle Class I. and that it was not Class II.

Dr. SIM WALLACE said that he did not recognise it in his first classification.

Mr. RUSHTON said that some years ago he endeavoured to conceive a classification on mechanical lines which further knowledge had proved to be inadequate. The more one thought of a classification on mechanical lines the more one was inclined to favour a classification on ætiological lines. But he thought a very long time would elapse before such a classification came about. The ætiology of many of the conditions was so obscure that, as the author said, it was only by years of co-ordinated clinical experience that the amount of knowledge necessary for such a classification could be obtained. But when such knowledge was got together, would it be simple ? He thought it would probably always be of a complex nature. Probably from an academic point of view it ought to be done, but would it be useful

from a practical point of view ? He thought it would not, because as a rule the operations of orthodontics were mechanical. He desired to ask whether, provided the same condition was brought about by two different ætiological factors, that would make the slightest difference in the method of rectifying the malformation ? If his contention were correct, it seemed to him that the problem of discovering the ætiology of the various conditions was more an academic than a practical one. If the ætiology of some of the malformations was discovered, of course, the question of prevention became much simpler. For instance, it was fairly well known in many cases that before it was possible to regulate the teeth, a child's breathing apparatus must be put in proper working order. They had discovered enough to insist upon that sort of thing being done if permanent results were desired, but from the mechanical point of view of regulating the teeth he doubted whether the ætiological factor was such an important one. M. Villain appreciated, as all the members did, that the jaws and the teeth must be considered as separate entities, and that was brought out in the tables. But if it was necessary to describe the various irregularities in any given case by the various phrases mentioned, it seemed to him the position would be a very complicated one. Personally he thought the only satisfactory way of discussing any problem in orthodontics was by means of an illustration of the case under review, which was the method adopted in the Society, which made a strong point of the exhibition of a photograph or a lantern slide. He strongly supported Dr. Sim Wallace's and Mr. Norman Bennett's opinion that post-normal occlusion occurred at, or very shortly after, birth, but its cause was still wrapped in mystery. He had seen some cases in which there was no obvious cause whatever. He could contradict Dr. Sim Wallace to a very slight extent by saying he had seen one case in which there had been unilateral slight post-normal occlusion in the temporary dentition which disappeared in the permanent dentition. Between the two dentitions an operation was successfully performed for the removal of adenoids, but whether that made any difference he did not know.

Mr. NORTHCROFT enquired if Mr. Rushton could state whether the upper or lower "E" on the side on which the post-normal occlusion occurred was removed first. He asked that question because in his experience of similar cases he had very often found that cases of slight unilateral post-normal occlusion could be corrected by the early removal—some people might think the too early removal—of the lower "E." That allowed the lower six on that side to slip slightly forward and come into normal occlusion. If, on the other hand, the upper "E" was lost early, with that condition the post-normality was increased instead of being decreased. He understood that in Mr. Rushton's case the teeth were extracted with that in view.

Mr. RUSHTON replied that none of them were extracted ; they came out. He could satisfy Mr. Northcroft on the point as he had a series of models of the case. In conclusion, he thought it was desirable the Society should express its great appreciation of the masterly and erudite paper that M. Villain presented to the Congress. The amount of work it contained was stupendous and the members very much appreciated it. The thanks of the Society were also due to Mr. Harold Chapman for his able translation.

Dr. SIM WALLACE said he desired to second the remarks that Mr. Rushton had made in that respect.

The vote of thanks was carried unanimously, and the Hon. Secretary was requested to communicate it to M. Villain.

Mr. HAROLD CHAPMAN said he was very pleased to hear Mr. Northcroft say he thought the terminology was an advance on the old one, because he was inclined to hold the same opinion. He did not know if the remarks Mr. Rushton made referred to the terminology or to the tables as a whole, but personally it did not seem to him that the tables were very complicated or difficult. N. G. Bennett had a classification and terminology of his own, but Villain's seemed to him simpler, although the meaning of some of the terms was not clearly defined.

(The speaker proceeded to describe the tables in detail).

Mr. NORTHCROFT said he did not at all see the force of using in the tables the terms "dento-maxillary orthopædics" instead of "dento-facial," indeed odonto-prosopic was better than either term. He noticed in the paper that no distinction was made between the maxillæ and the mandible, and he thought the words used in the paper in that respect constituted a retrograde step. He could not help thinking also that a great many terms used by Mr. Bennett, such as "translation" or "inclination" were very sound indeed and better than some of those used in the paper.

Mr. RUSHTON said the table brought out the point he had made that the more complete the list the more complex it became. A member would have to put a wet towel round his head if he wanted to describe on paper a tooth which was out of position in various ways as regards its position in the arch and towards its neighbours; its position as regards its vertical direction, and the malformation of the jaws, upper or lower, and also of the alveolus. He thought such things would always be better understood by means of an illustration. General principles such as those arrived at by Angle would always hold the field for practical work, although they might not be very correct in regard to details.

The CHAIRMAN was glad that the Society had recorded its thanks in a formal manner to M. Villain for the report he had written and to the Secretary for his excellent translation, by means of which an opportunity had been presented of discussing the report. It was interesting to find that about fifty per cent. of the references were to French writers and the remaining ones to foreign authors. That was an example to English orthodontists that might well be remembered. The paper was exceedingly difficult to discuss, but there were one or two points in the historical portion he desired to mention. On the second page the statement was made: "We have voluntarily omitted the names of Kingsley, Coffin, Gaine, Dwinelle, Redmond, Magill, Richardson, Francis Jean and others, because these authors, who have almost exclusively occupied themselves with the treatment of irregularities, have, without exception, contributed to retarding the advancement of dental orthopædics by the introduction of appliances as diverse as they are numerous." He did not think that Kingsley or Coffin (for example) had retarded the advance of orthodontics. He was ashamed to say that he had not heard of Schanze, with whose work M. Villain contrasted the work of others, but he did not think the author's conclusion was a just one. One statement was made: "Although Angle's classification, based on occlusion, forms only a part of the classification we need, it has captured the whole profession." It had captured many of them, but there were one or two present at the meeting whom it had not captured. It was a matter for regret that the terminology had not covered a wider field. It was very good as a start, but if anything further was done he hoped they would go beyond classification and deal with everything else that appertained

to orthodontics as well. Nearly everything had been said that could be said about the actual classification, but he thought it would be very difficult to visualize a case in connection with this classification, although from the academic point of view it appeared in many ways quite perfect, as other members had pointed out. Personally, he thought that Norman Bennett's classification was much more useful for working and other purposes than the classification given in the paper. The report that M. Villain had written was an extremely important one, for which he was sure the members of the Society were deeply grateful.

The meeting then terminated.

## ANNUAL GENERAL MEETING.

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THE annual general meeting for the year 1915 was held at 11, Chandos Street, Cavendish Square, W., on Wednesday evening, December 8th, 1915, Mr. W. FRANCIS MELLERSH, and afterwards Mr. J. E. SPILLER, occupying the chair.

The minutes of the last meeting were read and confirmed.

### ELECTION OF OFFICERS AND COUNCILLORS.

The PRESIDENT announced that the following gentlemen had been nominated by the Council to fill the various offices mentioned, and that, as no further nominations had been received, a ballot was not necessary, and he therefore declared them to be duly elected :—

President	..	..	..	Mr. J. E. SPILLER.
Immediate Past President			..	Mr. W. FRANCIS MELLERSH.
Vice-Presidents	..	..	..	Mr. J. LEWIN PAYNE.
				Mr. W. W. JAMES.
				Mr. P. SIDNEY SPOKES.
Secretary	..	..	..	Mr. HAROLD CHAPMAN.
Treasurer	..	..	..	Mr. H. C. HIGHTON.
Curator	..	..	..	Mr. B. MAXWELL STEPHENS.
Editor	..	..	..	Mr. CARL SCHELLING.
Librarian	..	..	..	Mr. J. H. DOHERTY.
Councillors	..	..	..	Mr. HEDLEY C. VISICK.
				Mr. A. H. CLOGG.
				Mr. SHELDON FRIEL.

### ELECTION OF TWO AUDITORS.

On the motion of Mr. G. NORTHCROFT, seconded by Mr. SCHELLING, Messrs. Blaaberg and Shaw were unanimously elected as auditors.

The PRESIDENT announced that Messrs. Arthur Colyer and J. F. Berwick were present as visitors.

### REPORT OF THE HONORARY TREASURER.

I have much pleasure in reporting that the statement of accounts for this year again shows a substantial balance at the bank, to the credit of the Society's account, despite the extraordinary expenses of the year.

The year was commenced with a balance of £153 4s., the amount received in subscriptions and interest was £96 17s. 11d., compared with £103 5s. 3d., the amount received during the period December 1st, 1913, to November 30th, 1914.

With regard to the expenditure, the cost of administration has increased by the amount of £14 2s. 11d., in addition to which the Society made a contribution to the amount of £52 10s. for the Dentists' War Relief Fund.

The available bank balance is £125 15s. 11d.

It has been arranged that £100 of the Society's funds be invested in the war loan.

## REPORT OF THE HONORARY CURATOR.

During the current year we have had several valuable additions made to our Museum, a list of which will be printed at the end of this report.

They are due greatly to the personal interest of our President ; also he has been well seconded by the efforts of the members of the Committee.

It is usual to make a suggestion or two in the curator's report, and accordingly I take the opportunity of suggesting that we should endeavour to collect a series of models showing the correction of abnormalities in the temporary dentition and at the same time models of similar types of cases at a later period in life, which have been allowed to remain uncorrected. These models, I think, would assist in bringing home to members the desirability of recognising and correcting irregularities in occlusion in the temporary dentition.

The following presentations have been made :—

The President. (1) Models and slides showing a method of manufacturing lower and partial upper expansion plates and the Mellersh pattern of expansion screw fixed thereto. (2) An improved design of "Mellersh" screw and expansion plate.

Mr. Lewin Payne. A model showing the impaction of an upper second temporary molar.

Mr. Hedley Visick. (1) Slides of case showing appliance for the combined buccal movement and retention of a lower first permanent molar. (2) Large working models of the original and the improved pattern of the Blue Island friction nut.

Mr. Hubert Visick. Models, photos and slides of a case in which the central upper incisors had been removed at an early age.

*Note.*—The communication of the particulars of this case to the Society has not yet been made.

Messrs. Claudius Ash & Co. A collection of tools used in manufacturing and manipulating appliances.

Julius Aderer. Specimens of arches, traction screws, etc.

The Blue Island Company. A case containing nine models with appliances *in situ* illustrating beautifully the means taken to accomplish certain orthodontic operations.

The Dental Manufacturing Company. Collection of tools, parts and materials for preparing appliances, including a Grünberg blowpipe.

(Signed) B. MAXWELL STEPHENS.

## REPORT OF THE HONORARY LIBRARIAN.

There is nothing of interest to report with regard to the library during the last year, no member having made use of it.

This is probably due to the international crisis.

The librarian will be glad if any members who have library books in their possession would return them as soon as possible.

J. H. DOHERTY, Librarian.

## REPORT OF THE HONORARY SECRETARY.

Considering the general situation the work of the Society for the year 1915 may be considered very satisfactory. The usual seven meetings were arranged, but two were not held.

At the January meeting the President gave his inaugural address, which was much appreciated ; four casual communications were also presented.

In February casual communications and cases and problems for discussion constituted the programme.

Mr. Bocquet Bull read a paper at the March meeting on "The teaching of Orthodontics." This difficult problem was treated in an

original manner and aroused a good discussion. Casual communications completed the agenda.

The October meeting was devoted to a discussion on the exhaustive report of M. Georges Villain to the Sixth International Dental Congress on "The unification of terminology and classification." A "casual" was given by Mr. Hedley Visick.

This evening we have the pleasure of Mr. J. F. Colyer's presence; he will present the communication he was prevented from giving last December.

During the year one new member has been elected and one has resigned, leaving the total membership the same as at this time last year, ninety-five ordinary members and one honorary member.

The chart to which I referred at the last annual meeting has received the consideration of your Council, and it is hoped it may be placed in your hands during the coming year.

Your Council has discussed the desirability of holding meetings during 1916, and has decided that it will be in the best interests of the Society that three be held, and these have been arranged for March 8th, October 11th and December 13th. The Council has power to call further meetings if desired.

It is unnecessary for me to refer to the increased difficulty of obtaining material for the meetings at this unsettled period, and so I take this annual opportunity to urge members to volunteer to make communications, especially as the Council is all against conscription in this matter.

In conclusion, I beg to offer my hearty thanks to all who have assisted in making up the agenda papers.

(Signed) HAROLD CHAPMAN, 1 Dec., 1915.

On the motion of Mr. W. RUSHTON, seconded by Mr. G. NORTHCROFT, the reports were received and adopted.

#### CASUAL COMMUNICATION.

### A Case for Extraction (?)

By Mr. GEORGE NORTHCROFT.

IT might be of interest to the Society to examine the models of a case of congenital absence of the mandibular incisors. The patient, a female *æt*, 9·2, has very marked proclination and translation of maxillary centrals, and left unilateral post-normal occlusion.

It is interesting to observe how in this instance Angle's claim that the upper arch moulds itself round the lower seems to be borne out.

I should be glad to hear suggestions as to the treatment of this case.

I have only the mother's word as proof that the condition shown is congenital, but curiously enough the other day a similar, but younger, case passed through my hands.

In this case the models show the temporary centrals *in situ*, with the permanent laterals erupted on either side. The radiograph shows the absence of permanent centrals. The dark shadows in the roots of both temporary teeth need explanation.

In the second case there is at present no sign of protrusion, a bunching of the maxillary incisors is taking place, and it is interesting to speculate as to the best treatment. Clearly expansion is *not* indicated.

Mr. H. BALDWIN, in opening the discussion, said he had not seen the models of the case, but he suggested that as there was a deficiency of teeth in the lower jaw it would be better to extract some in the

A CASE FOR EXTRACTION.



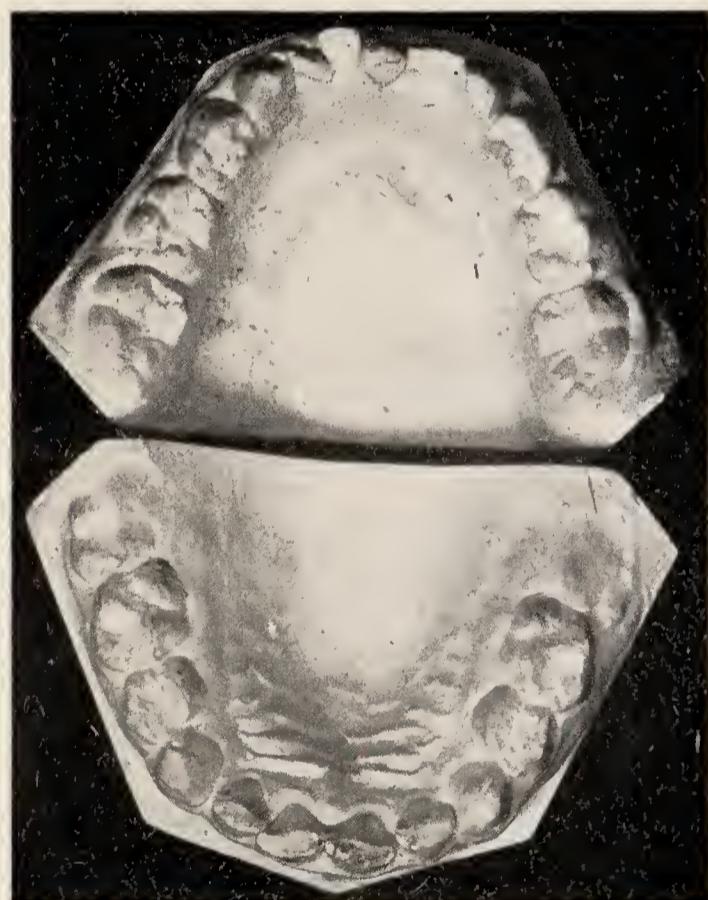
MODEL CASE I.  $\text{A}\text{Et } 9\text{.}2$ .  
Note protruding incisors and receding chin.



CASE I.



CASE I.



CASE II. Boy  $\text{a}\text{et } 5\text{.}11$ .



X-RAY OF LOWER INCISORS OF CASE II.

ILLUSTRATING A COMMUNICATION BY MR. GEORGE NORTHCROFT.



upper ; and, as the upper front teeth were irregular and prominent, in order to preserve the characteristic front teeth he thought the best plan to adopt would be to extract the bicuspids. The teeth were, he presumed, sound.

Mr. NORTHCROFT said that they were sound.

Mr. B. MAXWELL STEPHENS said that, as the temporary canines appeared to be missing, he would prefer to extract the two upper laterals, risking the appearance of the canines afterwards, bringing the central incisors in and then bringing the lower lateral incisors together.

Mr. H. BALDWIN said that as he had now had an opportunity of seeing the models he thought it would be equally good practice to extract the laterals.

The PRESIDENT said that a good many years ago he remembered seeing a somewhat similar case in which a very fair result was obtained by extracting the laterals, and then retracting the central incisors, the points of canines being subsequently cut down and polished.

Mr. G. NORTHCROFT, in reply, said he recorded the cases as a matter of interest. It was necessary to recognise that in both jaws the number of units had to be the same. Therefore if the lower jaw lacked two units, two units must also be removed from the upper jaw in order to make the two arches symmetrical. Personally, he thought he would elect to extract the laterals in order to bring the centrals into alignment with the maxillary canines. He had not quite made up his mind what to do with the second case, but he thought the temporary centrals should certainly be removed, as they showed marked signs of absorption.

The following communication was then given :—

### **A Brief Account of an Investigation into Variations of Position of the Teeth in Monkeys.**

By Mr. J. F. COLYER.

Mr. Colyer exhibited a large number of lantern slides taken from specimens of monkeys of the old and new worlds in the possession of the Royal College of Surgeons, and from his own collection, giving a running commentary upon them. He pointed out the comparative frequency of certain forms of irregularities in various races of the quadrupeds living in districts under similar conditions. The communication was of the greatest interest and, through stress of other work, was given verbally instead of by a written paper.

The PRESIDENT said he was sure he voiced the sentiments of the members when he said they were extremely grateful to Mr. Colyer for giving such an instructive and masterly address. Such a record of tireless investigation could not but arouse feelings of the highest appreciation and admiration, and he trusted that when the author had proceeded further with his investigations he would favour the Society with another address on the subject.

Mr. GEORGE NORTHCROFT said he could not allow the opportunity to pass without echoing the President's words of thanks to the author for his interesting paper, and saying how much personally he appreciated and envied his tireless energy. He had clearly shown that a great many of the irregularities which might occur in human beings were due to other than mechanical causes, and it was therefore necessary to

pause before trying to correct those irregularities mechanically. On the other hand, it was very obvious that some irregularities were produced by mechanical agencies, and those cases, he thought, they would be justified in continuing to treat mechanically. The geographical environment of the different species was a very fascinating question, and he would be interested to hear that someone had enthusiasm enough to work it out further.

Mr. W. RUSHTON congratulated the author, not only on his interesting paper, but also on the wonderfully beautiful specimens he had shown. It seemed to him the great difference between those specimens and those which had to be dealt with in practice was that in human beings irregularities were as a rule due to extrinsic causes, while those in monkeys and apes were due to intrinsic causes. The greater proportion of the irregularities treated in ordinary practice were caused by the non-development of the bones of the jaw, and cases in which the jaws were deformed by some practice of human beings which was not indulged in by monkeys. That, he thought, very largely differentiated the cases from those dealt with by the author. At the same time it was interesting to see how some of the irregularities described were foreshadowed in our remote ancestors. He was entirely in accordance with the author's remarks with regard to the large teeth and the small jaw. He thought there was no doubt such a thing did occur, and it would be very interesting to know to what extent the jaw reacted on the teeth and the teeth on the jaw. Cases were frequently seen in which all the teeth were fully formed and of good size, but the formation and eruption of the teeth seemed to have had no influence whatever on the formation and expansion of the jaw ; for instance, in the remarkable case of progeria at the Royal College of Surgeons, in which all the teeth were of a good normal size, the greatest width of the maxilla was something like  $\frac{1}{4}$  in. On the other hand, cases of jaws were seen in which no teeth whatever, either temporary or permanent, had erupted, although the jaws were to all intents and purposes as large as those of a person whose teeth had erupted in a normal way. He did not think the author had laid sufficient stress on what might be termed the accidental causes of many of the irregularities he mentioned, such as fractured temporary teeth, retarded temporary teeth, and so on, in regard to which, of course, nothing could be proved, but which one strongly suspected were the cause of a great many of the irregularities described. The author also referred to irregularities in some of the specimens which he did not think the ordinary person would regard as such, for instance, where the general shape of the jaw was ovoid or elliptical. That formation seemed to him to be typical of the race or genus. Mr. Spokes, who was too modest to speak for himself, had suggested to him (Mr. Rushton) whether the asymmetry which the author had so well described was always on the one side. In the specimens which had been shown the asymmetry pointed towards the right side, and Mr. Spokes suggested that that was the first groping of the animal after right-handedness—that he grasped the food in his right hand and turned his head to the right side in order to get a good bite at it.

Mr. SPOKES, after humorously protesting against confidential communications being made public, said that in two of the photographs shown by the author the asymmetry was certainly to the right side of the front part of the maxilla rather than to the back. He then pictured to himself the possibility of the animal, before its bones had become well formed, hanging on to something and giving a good shake on that side, and if it was in the early stage of the right-handedness of the animal it seemed to him it might modify the development of the maxillæ in that particular part, more especially towards the front.

Mr. H. BALDWIN, echoing the thanks which had been accorded to the author for his interesting paper, and expressing his appreciation of the energy and initiative he had exhibited in working on such new ground, thought the main interest of the investigation was in two directions, firstly, that there were many more irregularities in monkeys and other lower animals than they knew of or expected, and secondly, that a similar kind of variation occurred in animals of the same species, which sometimes came from the same locality. If that point could be followed out, he thought a great deal of light might be thrown on the etiology of the cases. It seemed to him, as the author stated, that most of the cases of crowding were due to the bone being insufficiently formed on the side where the irregularity occurred. Whether investigation would show that the etiology was due to extrinsic causes or to heredity was at present unknown.

Mr. J. F. COLYER, after thanking the members for the very kind way in which they had received his lecture, said, in reply to Mr. Rushton, that he had tried to show that the causes of irregularity *were* due to the fact that the jaw did not develop and that that want of development might be due to extrinsic as well as intrinsic cause. He believed that the so-called want of development in the human being in many cases was distinctly due to an intrinsic rather than an extrinsic cause. In an extrinsic case, such as adenoids, the arch was borne in in two directions, premaxillary and in the direction of the molars; there was not much crowding of the premolars. But that did not account for those cases of crowding where there was a perfectly regular arch in the region of the incisor teeth, where there was no over-crowding and yet there was a general crowding. Then Mr. Rushton had said that many irregularities were not due to intrinsic causes. He (Mr. Colyer) tried to show at the College of Surgeons two years ago that a line must be drawn between intrinsic and extrinsic. An intrinsic cause related to something that was inherited, something that was acquired by the individual at his formation, and might be due to a bad mixing of the germ plasma. He had tried to show that a large number of the irregularities which practitioners were inclined to consider as due to acquired causes were due to intrinsic causes, and he illustrated that by a very complete series of specimens showing irregularities of the canines. In a case of irregularity of the canine, where the crown pointed *upwards*, it was said that was due to an intrinsic cause, but in a case in which the canine was pushed only a little bit out, probably erupting with a *slight tilt* upwards, it was said that was due to an acquired cause. But with a series of specimens it was possible to trace the whole sequence right away through from the slight irregularity to the complete irregularity, and he was one of those who believed that a lot of the slight displacements of canines were due to intrinsic causes or heredity. He did not think the accidental causes were of much account in the case of monkeys. A very large series of specimens was exhibited in the South Kensington Museum, and it would be found that caries was practically unknown in the deciduous dentition of those animals, and early loss of teeth, such as was met with in man, did not occur. The only irregularities that might be liable to occur from deciduous teeth were in the region of the second premolar. Nearly all the cases were practically symmetrical, and that pointed to a deeper cause than an accidental one. When in the course of his paper he referred to the question of ovoid arches, he tried to show that the shape of the arch had nothing to do with the irregularity at all. He endeavoured to illustrate that most extraordinary variations were obtained in the arch, an ovoid arch being obtained in some and a straight arch in others. If the specimens were carefully examined it would be found that it was not the arch that varied, but the material

that formed the arch. He would look up the cases of asymmetry to which Mr. Spokes referred. He did not think they were probably due to the cause to which Mr. Spokes attributed them, because there were very definite signs in nearly all the specimens of want of growth ; and there was one particular specimen of a baboon in which on the side where the asymmetry occurred there was a direct displacement of the second or first year premolar, showing that there had been a complete want of growth on that side. It was a subject of keen interest, from which a great deal could be learned.

### **Valedictory Address.**

The PRESIDENT delivered the following valedictory address :—

Gentlemen,—Another year in the history of our Society has passed all too quickly, and my term of office as President has come to an end. It is not possible for me now to look back on this period without some regret at the thought that if it could be lived over again one might take more advantage of the opportunities presented for the further advancement of the objects for which our Society was called into being.

The universal unrest, however, and social upheaval caused by the war have made it difficult for some of us to apply ourselves calmly to the consideration of problems pertaining to our own sphere of work, which seem somewhat petty in comparison with those vastly greater ones confronting the world to-day. At the same time it has often been a relief to turn from them to the ordinary every-day business of "carrying on." and as students we should consider how further progress may be achieved. Kipling, in one of his books referring to a person tolerant of religious matters, writes of him as "viewing each creed impartially—seeing the good in each." This must be our attitude in dealing with the various methods of treating malocclusion, and as time goes on the need for a post-graduate school may be more widely felt. One of our former presidents, Mr. Hopson, remarked, during a discussion this year, that he quite foresaw the freshly qualified licentiate would be expected to be an expert in the treatment of all cases of irregularity which might present themselves in the practice of the person enquiring for an assistant. It goes without saying that this is impossible, and if evidence were asked for, it could be found in such work as was brought to our notice by Mr. Sheldon Friel, and in an examination of the specimens in our Museum.

London ever attracts to herself the most skilful exponents of the arts and sciences and is it too much to hope that a time may come when a post-graduate school for the study of orthodontics may be established, staffed by those most competent to teach, and which, filled with students from far and near, will be worthy of our great metropolis ?

I have to express my deep gratitude to our hon. secretary, treasurer and the other officers and members of Council for the cordial sympathy and help in making my year of office a very happy one.

Finally, I must ask my friend, Mr. Spiller, to take the chair he is so well qualified to fill, hoping that those objects for which the allied nations are fighting may be secured during his term of office.

At the conclusion of the reading of the address, the chair was vacated by Mr. MELLERSH and taken, amid hearty applause, by the new President, Mr. J. E. SPILLER.

The PRESIDENT (Mr. Spiller) said he was very conscious of the honour that had been done to him by electing him to the chair of the

Society, and he thanked the members very much indeed for it. His one aim would be to follow the example set by Mr. Mellersh and the other distinguished gentlemen who had preceded him. He was extremely glad that Mr. Chapman would continue to hold the post of secretary, because it meant that his (the President's) duties would be comparatively light.

Mr. GEORGE NORTHCROFT thought the meeting should not be allowed to terminate without the members expressing their very grateful thanks to Mr. Mellersh for so ably presiding over them in the past year, and also for his valedictory address. Good wine needed no bush, and he was sure Mr. Mellersh would be the last man in the world to wish to hear his praises sung in his presence. He therefore simply moved a very hearty vote of thanks to Mr. Mellersh for his work during the past year.

Mr. W. RUSHTON seconded the motion, which was carried by acclamation.

Mr. MELLERSH, in reply, said he was extremely obliged to his old friend Mr. Northcroft for the kind words he had said, to his friend Mr. Rushton for seconding the motion, and to the members for the kind way in which it had been received. He told them when he first became President that he was completely conscious of his own unworthiness, and his feeling in that respect had not in any way diminished. Nevertheless, he thanked the members very much indeed for their great kindness to him during his year of office.

On the motion of the PRESIDENT, the thanks of the Society were accorded to Mr. George Northcroft for his interesting casual communication, and to Mr. J. F. Colyer for his interesting and instructive communication, and the meeting terminated.

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## THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS.

STATEMENT OF ACCOUNTS from December 1st, 1914, to November 30th, 1915.

We have examined the Books and Vouchers and certify the above statement of Accounts to be correct.

(Signed)—LEWIS JEFFERY,  
HY. MARSH,  
Hon. Auditors.

## List of Members of the British Society for the Study of Orthodontics.

---

Aubrey, H. P.  
 Austen, Leslie G.  
 Badcock, G. W.  
 Badcock, J. H.  
 Baldwin, H.  
 Barrett, Russell.  
 Bascombe, E. D.  
 Bennett, F. J.  
 Bennett, Norman G.  
 Blaaberg, Charles J.  
 Bowes, J. A.  
 Briault, E. H. L.  
 Brown, J. R.  
 Bryan, Hermann  
 Bull, F. B.  
 Campion, G. G.  
 Campkin, Hugh T.  
 Chapman, Harold  
 Chapman, Ralph  
 Clarence, Thomas H.  
 Clegg, Arthur H.  
 Cribb, H. E.  
 Denham, N.  
 Doherty, J. W.  
 Edey, G. Russell  
 Farmer, F. M.  
 Fernie, J. G.  
 Field, George  
 Friel, Sheldon  
 Gardner, Chas. R.  
 Goldie George J.  
 Green, W.  
 Heath, Robert H.  
 Henry, P. F.  
 Highton, Herbert C.  
 Hopson, Montagu F.  
 James, W. W.  
 Jeffery, Louis  
 Johnson, Arthur W.  
 Johnson, Gordon  
 Johnson, Sydney  
 Knaggs, S. A.  
 Knowles, C. Heygate  
 Lacey, A. G.  
 Layton, G.  
 Lees, C.  
 Lockett, A. C.  
 McBride, John  
 McKechnie, J. D.  
 endleson, B.  
 40, Curzon Street, Mayfair, W.  
 Cambridge House, Portsmouth.  
 32, Brunswick Place, Hove.  
 140, Harley Street, W.  
 37, Cavendish Square, W.  
 41, Harley Street, W.  
 Melford Lodge, Bourne Avenue, The Square, Bournemouth.  
 17, George Street, Hanover Square, W.  
 50, Brook Street W.  
 27, Tavistock Square, W.C.  
 28, South Side, Clapham Common, S.W.  
 145, Finchley Road, N.W.  
 40, Bridge Street, Uttoxeter.  
 26, St. Giles Street, Norwich.  
 Guy's Hospital, S.E.  
 264, Oxford Road, Manchester.  
 71, Harley Street, W.  
 15, Upper Wimpole Street, W.  
 76, Grosvenor Street, W.  
 24, Upper Wimpole Street, W.  
 18, Central Hill, Upper Norwood, S.E.  
 15, Stratford Place, W.  
 29, Albemarle Road, Beckenham.  
 Stranraer, Bernard Gardens, Wimbledon.  
 153, High Street, Bromley.  
 St. Winifred's, Hampton, Middlesex.  
 Holmleigh, Murray Road, Northwood, Middlesex.  
 117, Park Street, W.  
 71, Lower Baggot Street, Dublin.  
 22, Wimpole Street, W.  
 95, Merrion Square, Dublin, Ireland.  
 South View, 10, North Common Road, Ealing, W.  
 1, Park Crescent, Portland Place, W.  
 79, King William Street, E.C.  
 17, Upper Wimpole Street, W.  
 64, Harley Street, W.  
 2, Park Crescent, Portland Place, W.  
 1, Newton Villas, Finsbury Park, N.  
 71, Grosvenor Street, W.  
 115, Harley Street, W.  
 65, Church Road, Hove.  
 21, Rosslyn Hill, Hampstead, N.W.  
 15, Worsley Road, Hampstead, N.W.  
 Stedham House, Surbiton.  
 12, rue Belliard, Bruxelles (Corresponding Member).  
 Breifond, Boyne Road, Tunbridge Wells.  
 Hereford House, 117, Park Street, W.  
 26, Duke's Avenue, Muswell Hill, N.  
 29, Queen Anne Street, W.  
 24, Upper Phillimore Place, W.

**List of Members—continued.**

Malleson, H. C. 30, Thurlow Road, Hampstead, N.W.  
 Marsh, H. E. 1, Cantelupe Road, Bexhill, Sussex.  
 Mason, E. N. Sandown, 306, Broadway, Bexley Heath.  
 Mathews, E. F. Cale 60, Newhall Street, Birmingham.  
 May, Walter J. 24, Upper Wimpole Street, W.  
 Mayer, J. W. Stedham House, Surbiton Hill.  
 Mellersh, W. Francis 76, Wimpole Street, W.  
 Morgan, Reginald C. 15, Woodsome, Totnes Road, Paignton.  
 Morris, C. S. 88, Park Street, W.  
 Morris, L. F. West Moor, Poole Road, Bournemouth.  
 Northcroft, George 115, Harley Street, W.  
 Parfitt, J. B. 179, King's Road, Reading.  
 Pavitt, P. G. 57A, Wimpole Street, W.  
 Payne, J. L. 18, Portland Place, W.  
 Pearce, F. J. 57A, Wimpole Street, W.  
 Philpots, Montague 14, High Street, Windsor.  
 Pollitt, G. Paton 50, Brook Street, Hanover Square, W.  
 Porteous, Hugh T. 15, Cavendish Place, W.  
 Preedy, E. J. 1, Hanover Square, W.  
 Rilot, Chas. F. 22, Wimpole Street, W.  
 Rowlett, A. E. 165, London Road, Leicester.  
 Rushton, W. 32, Harley Street, W.  
 Samuel, B. Barnett 76, Wimpole Street, W.  
 Schelling, C. 37, Cavendish Square, W.  
 Scobie, James 145, Finchley Road, N.W.  
 Scott, P. 1, The Mall, Wanstead, N.E.  
 Shore, H. D. 4, Seymour Street, W.  
 Spiller, J. E. 62, Worple Road, Wimbledon, S.W.  
 Spokes, P. Sidney 4, Portland Place, W.  
 Stephens, B. Maxwell 76, Grosvenor Street, Grosvenor Square, W.  
 Stranach, W. S. 18, Stratford Place, W.  
 Sturridge, Ernest 29A, Wimpole Street, W.  
 Tattersall, Harold 1, Sandwell Mansions, N.W.  
 Thew, W. 140, Harley Street, W.  
 Thomson, George 38, Harley Street, W.  
 Turner, J. G. 59, Wimpole Street, W.  
 Turner, V. E. Prince of Wales Road, Norwich.  
 Visick, Hedley C. 29, Queen Anne Street, W.  
 Wallace, Dr. J. Sim 150, Harley Street, W.  
 Watson, A. MacDonald 3, Redcliffe Parade West, Bristol.  
 White, Ernest 394, Glossop Road, Sheffield.  
 Winderling, Professor Via Manzoni 45, Milan, Italy (Corresponding Member).  
 Aldo Maggioni  
 Wood, Bryan J. 7, London Road, Kettering.

**HONORARY MEMBER.**

Bogue, E. A. 63, West 48th Street, New York, U.S.A.







